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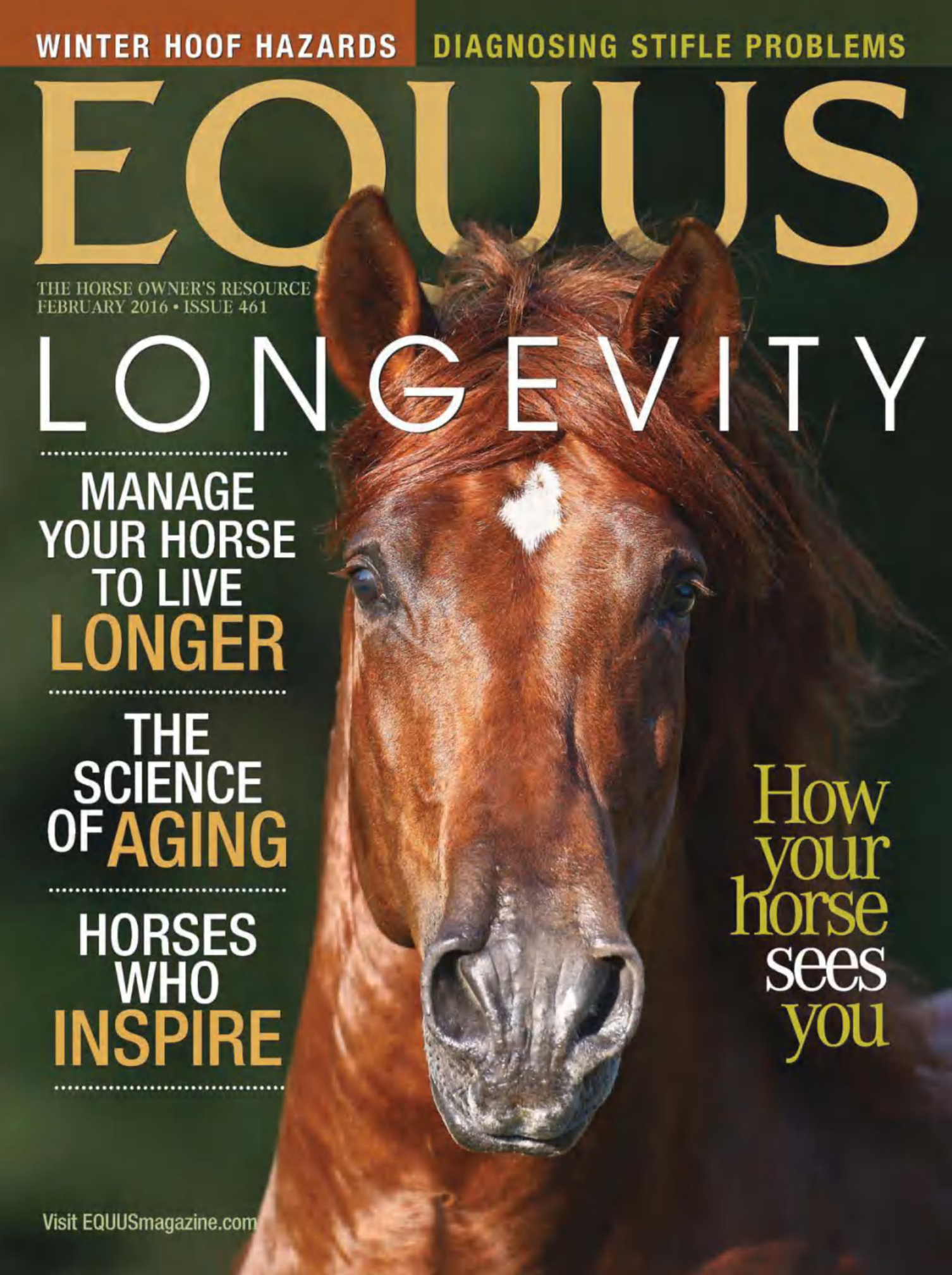
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[1] UC Davis (Nicola Pusterla) & Merck Animal Health. Infectious Upper Respiratory Surveillance Program. Ongoing Research 2008-present.
[2] Townsend HGG. Onset of protection against live-virus equine influenza challenge following vaccination naive horses with a modified-live vaccine. Unpublished data.

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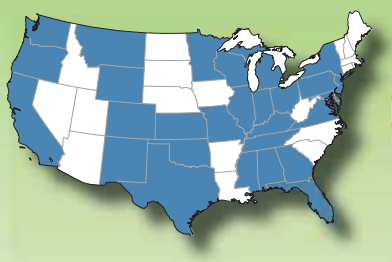
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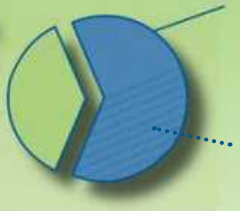
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Our featured horse is Son Shining Rooster, www.sonshiningrooster.com



Fescue toxicosis is caused by the ingestion of an endophytic fungus which infects tall fescue grass. A study[1] evaluating the prevalence of endophytic fungus in the US enlisted over 800 farms across 31 states* and shows more than half of the farms did not realize they had fescue in their pastures.





63%
of farms in US tested positive for endophytic fungus

57%
of positive farms claim to have NO fescue grass

*Participating states in blue

1. Survey of Endophyte Infection and it's Associated Toxin in Pastures Grazed by Horses, B. McCluskey, MS, DVM; J. Truab-Dargatz, MS, DVM; L. Garber, MS, DVM; F. Ross, MS. AAEP Proceedings, Vol. 45, 1999

Pregnant mares grazing fescue may exhibit the following clinical signs:

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HUMAN WARNINGS: Not for use in humans. For oral use in animals only. Keep this and all drugs out of the reach of children. Pregnant and lactating women should use caution when handling EQUIDONE Gel, as systemic exposure to domperidone may affect reproductive hormones. Consult a physician in case of accidental human exposure.

PRECAUTIONS: EQUIDONE Gel may lead to premature birth, low birth weight foals or foal morbidity if administered >15 days prior to the expected foaling date. Accurate breeding date(s) and an expected foaling date are needed for the safe use of EQUIDONE Gel. Do not use in horses with suspected or confirmed gastrointestinal blockage, as domperidone is a prokinetic drug (it stimulates gut motility).

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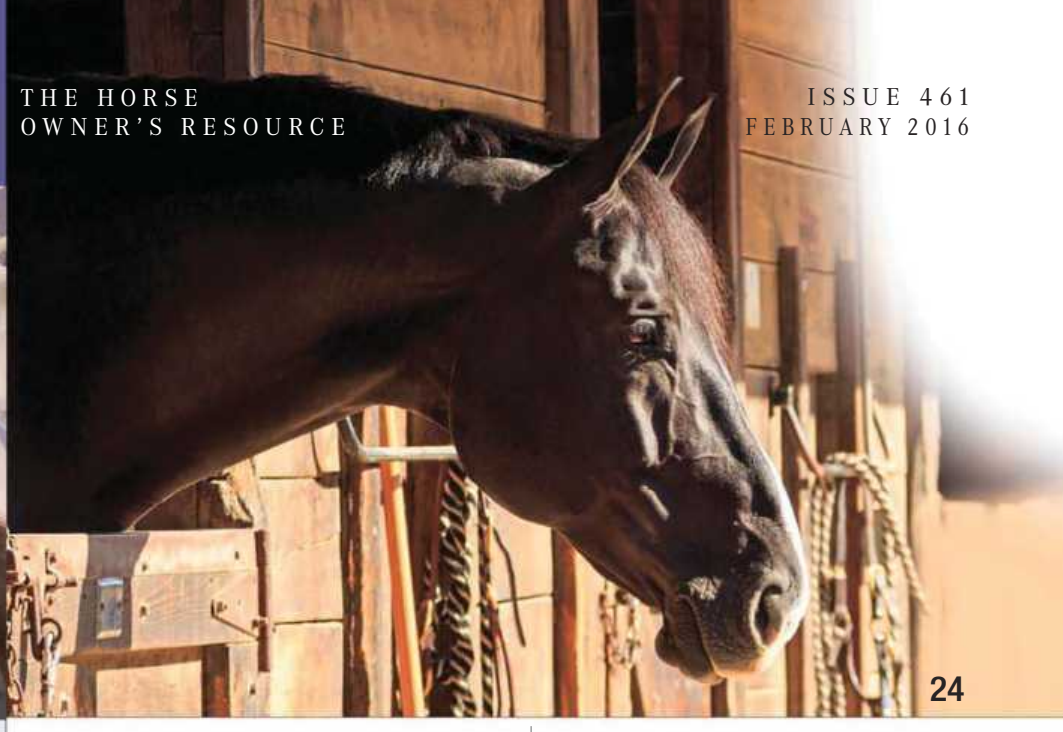
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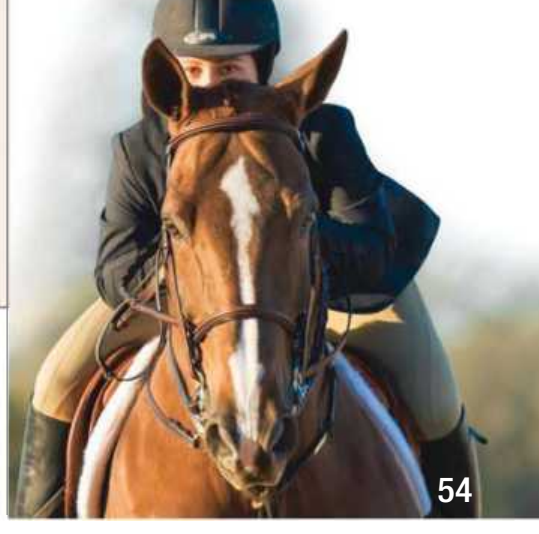
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WEB-SITE ADDRESS Equusmagazine.com

SUBSCRIPTION INQUIRIES E-mail: Equus@emailcustomerservice.com
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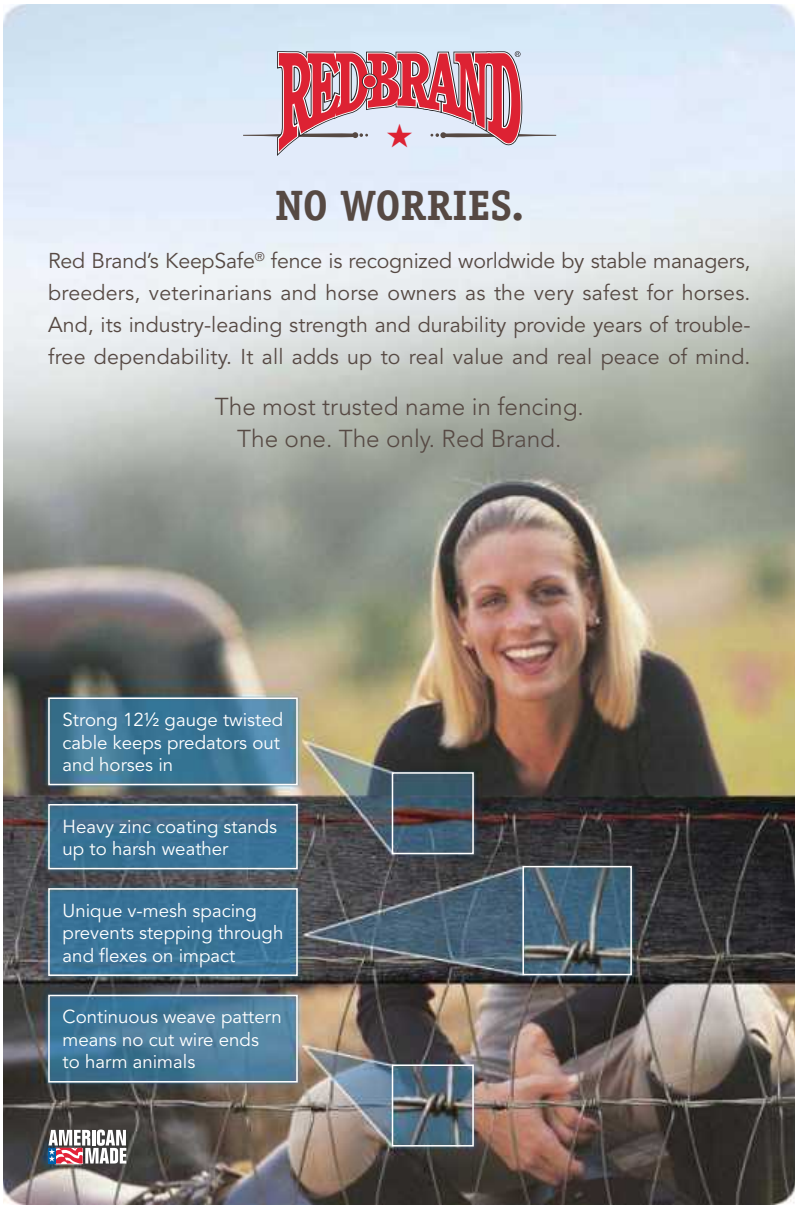
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Cathy Laws

GROUP PUBLISHER
David Andrick
dave.andrick@EquiNetwork.com

ADVERTISING

ASSOCIATE PUBLISHER
Dawn Kirlin
(540) 272-1508; dkirlin@aimmedia.com

ADVERTISING REPRESENTATIVES

Kathy Dando
(717) 303-3790 ext. 1003; kathy.dando@EquiNetwork.com

Michelle Adaway
(859) 619-8263; madaway@aimmedia.com

Susan Lee
(540) 905-9111; slee@aimmedia.com

Rick Swan
(480) 471-4671; rick.swan@EquiNetwork.com

Tom Brazil
(805) 379-8729; tbrazil@aimmedia.com

AUTOMOTIVE/TRUCK REPRESENTATIVE

Keith Cunningham
(248) 763-0526

CLASSIFIED ADVERTISING REPRESENTATIVE
Warren Wilson
(800) 633-6789;
fax: (760) 546-1459;
equus@aimclassifieds.com

ADVERTISING INFORMATION MANAGER
Judy Howard

ADVERTISING COORDINATOR
Alicia Smith

DIGITAL ADVERTISING OPERATIONS MANAGER
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rgoldy@aimmedia.com

CIRCULATION DIRECTOR: Dana Raven
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PRODUCTION

GROUP PRODUCTION DIRECTOR: Barb Van Sickle
(303)625-1624; bvansickle@aimmedia.com

PRODUCTION MANAGER: Hillary Kerrick
(303) 625-1660; hkerrick@aimmedia.com

PREPRESS MANAGER: Joy Kelley

PREPRESS SPECIALIST: Idania Mentana

EDITORIAL AND ADVERTISING OFFICES
656 Quince Orchard Road, Suite 600
Gaithersburg, MD 20878;
(301) 977-3900; Fax (301) 990-9015;
E-mail: EQletters@EquiNetwork.com

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EQ LETTERS

Still going strong



"Every day is a bonus when one is 95!" says Val Willis. In December 2014, Val was featured in EQUUS riding a horse named Joy for her 94th birthday ("Where There's a Will," Back Page, EQUUS 447).

Last fall, for her 95th birthday, Val not only rode on a horse but also demonstrated some of the Yoga With Horses taught by her friend Susan Allan of Willaway Farm in Almonte, Ontario. (Val and her late daughter Kenra once owned Willaway Farm.) More than 70 people gathered at the Royal Ottawa Golf Club for Val's birthday party in September.

Colleen Rutherford Archer
Deep River, Ontario

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EQUUS welcomes freelance submissions for practically any section of the magazine. We prefer to receive manuscripts via email; send to EQLetters@EquiNetwork.com. We will also consider typed hard-copy manuscripts, but please note: If you would like your materials returned, a self-addressed, stamped envelope needs to be included with your submission. We do not review or accept simultaneous submissions.

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- **Features** generally run from 1,600 to 3,000 words.
- **Medical Front** (200- to 400-word items)—Brief articles about the latest research, technological advances, treatments and other veterinary topics pertinent to horse owners.
- **Hands On** (100- to 400-word items)—Short items offering practical advice and useful reminders on everyday horse care issues, ranging from feeding and hoof care to training and breeding.
- **True Tales** (700 to 2,000 words)—True stories that focus on particular experiences that typify the multifaceted relationships we have with our horses.
- **Case Reports** (1,000 to 2,500 words)—Equine practitioners and horse owners share their accounts of unusual or baffling cases of equine illness or injury.

Contact Information:
EQUUS Editorial Department
656 Quince Orchard Rd., Suite 600
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TRUE TALE

Rescue me

Rescued by a rescue

I look forward to my EQUUS magazine each month. I connected with "Rescue Me" (True Tale, EQUUS 459), and I cried reading about the horse who was rescued and how he, in turn, rescued his owner.

I adopted a 7-year-old American Saddlebred six years ago in my mid-60s. I had always loved horses but never had the opportunity to ride. He gives us so much joy, and he helped me get through my fight with cancer as well as losing my daughter. I tell him everything and sing to him while he's grazing on a lead rope. I'm with him almost every day, and I have two granddaughters who love him, too.

Carol K. Carbray
La Grange, Illinois

New canine vaccine

"On Watch for Dog Flu" (Barn Dogs, October 2015, EQUUS 457) states that "there is currently no vaccine available for H3N2," which is the Asian strain that first appeared in the United States in 2015 and sickened thousands of dogs in 24 states.

I just wanted to let you know that Merck Animal Health received conditional licensure for its H3N2 vaccine on November 20, 2015. The vaccine is now available to veterinarians throughout the United States and is recommended for healthy dogs 6 weeks of age or older.

Kelly Goss
Director, U.S. Communications
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By Christine Barakat and Mick McCluskey, BVSc, MACVSc



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PROTECT **HERDA** HORSES FROM THE SUN

A good way to help horses with the devastating skin condition known as hereditary equine regional dermal asthenia (HERDA) is to limit their exposure to sunlight, according to a new study from the Laboratory for Comparative Orthopaedic Research at Michigan State University.

HERDA, which is passed along through certain Quarter Horse bloodlines, leads to extremely fragile skin that easily tears. It is an autosomal recessive disorder, meaning that horses who inherit only a single copy of the defective gene are carriers who won't develop the problem; however, when two carriers are mated, their offspring have a one-in-four chance of developing the condition. Severely affected horses can't be ridden because even normal pressure from tack creates large, open wounds that do not heal. Previous research has shown that HERDA is a form of Ehlers-Danlos syndrome, a group of genetic diseases caused by mutations in the genes that control collagen[0] formation.

The risks of sun exposure for HERDA horses have been recognized anecdotally for some time, says Ann Rashmir-Raven, DVM, MS, DACVS, PGCVE. "If you speak to people who are familiar with these bloodlines and this condition, you'll learn that keeping these horses out of the sunlight improves their skin. And I personally observed that when we'd get horses with the condition at the research clinic, their skin would improve while they were kept indoors during quarantine."

Building on this knowledge, the Michigan researchers began investigating the role that exposure to UV light may have on the condition. "When human skin is exposed to light, the enzyme known as collagenase is upregulated," explains Rashmir-Raven. "Collagenase eats collagen. To some degree, this can be helpful; in order for skin to repair itself it needs collagenase. But too much sunlight can push this to the point where it's destructive. If you have friends who sunbathe regularly, you notice their skin is quite different by the time they are 50. That's in part because the UV light from the sun increases collagenase activity."

For the study, researchers took full-thickness skin samples from various anatomical locations on seven horses diagnosed with HERDA and six normal ones. A total of 24 samples were taken from each horse, and half were incubated in a collagenase solution to produce the same effect that exposure to sunlight would. Researchers then used a machine to test all of the samples for stretchability.

"We were measuring how

Reference: "Increased susceptibility of skin from HERDA (Hereditary Equine Regional Dermal Asthenia)-affected horses to bacterial collagenase degradation: a potential contributing factor to the clinical signs of HERDA," *Veterinary Dermatology,* December 2015

much force it took to stretch a sample," says Rashmir-Raven. They found that it took 24 times less force to stretch HERDA skin after exposure to the collagenase solution than it took to stretch the skin of normal horses with the same exposure.

Rashmir-Raven says the structure of collagen in horses with HERDA likely accounts for their response to the enzyme. "A normal horse has tightly packed collagen, similar to tightly packed, uncooked spaghetti still in the box," she explains. "A horse with HERDA, however, has very irregularly stacked collagen, a bit like a pile of cooked, loose spaghetti. The problem with this architecture is it provides so much more surface area for collagenase to act on, so collagenase can be much more destructive." She adds that the pattern of HERDA lesions, with more being found over the back and topline, correlates to sunlight exposure.

This study not only verifies the observations of those who have cared for HERDA horses but provides some guidance on management techniques. "One of the most beneficial things we can do for these animals is to minimize their exposure to sunlight," says Rashmir-Raven. "Turning them out at night and keeping them stalled for much of the day will help. A UV-blocking fly-sheet can be used in horses where confinement is not possible if it doesn't damage skin at the withers or elsewhere."

Ultimately, says Rashmir-Raven, the spread of HERDA should be controlled by the testing of all breeding animals with susceptible bloodlines. And that, she says, can be done in a way that doesn't remove the desired genes.

"Some carriers are top performers with wonderful genetics," she says. "You can continue to use them for breeding if you are not breeding to another carrier; otherwise you will produce an affected foal 25 percent of the time. It behooves everyone to test mares and stallions alike and not breed carriers to carriers."

MULTIPLE **IMAGING TECHNOLOGIES** BEST IN **STIFLE DIAGNOSIS**

A study from Colorado State University suggests that it's best to use a combination of imaging techniques when diagnosing stifle joint problems.

The researchers reviewed the records of 37 horses (47 stifles because some horses had bilateral pain) admitted to the university clinic for evaluation of potential stifle injuries, paying particular attention to the results of ultrasonographic and arthroscopic examinations.

They found that damage to the fibrous "cup" on the inside of the joint (medial meniscal lesions) was detected more often with ultrasonography, which uses high frequency sound waves to create images of internal body structures, than with arthroscopy, a minimally invasive surgical procedure that involves the insertion of a fiber optic tube and tiny video camera.

Bone spurs in the joint were also more likely to be detected via ultrasound. And damage to the patellar ligaments, which stabilize the entire joint, was only detected with ultrasound.

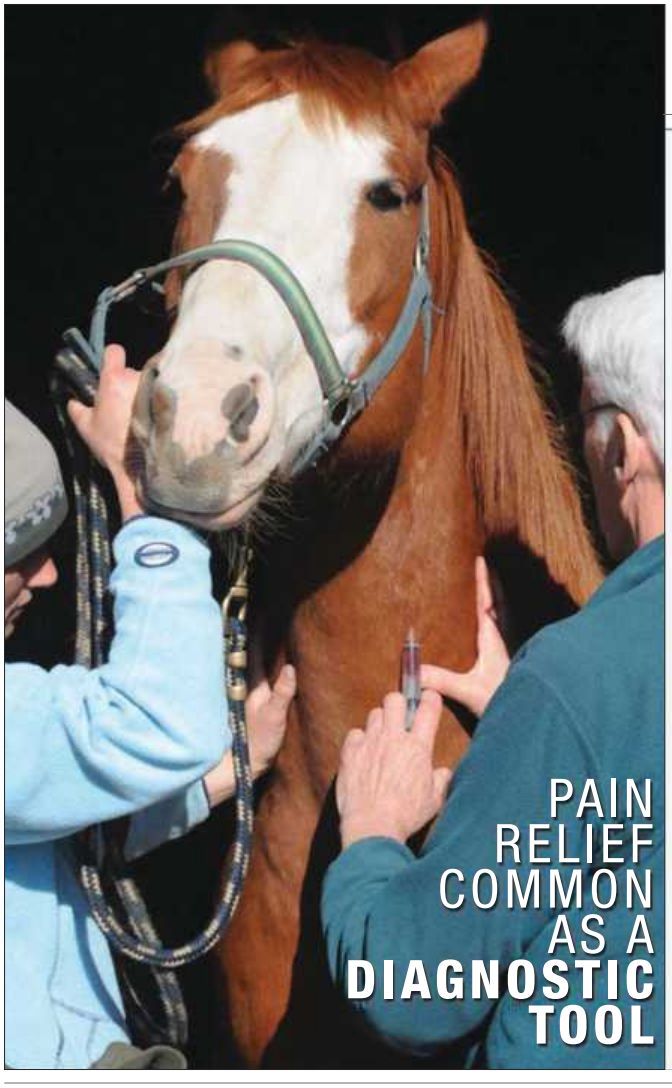
On the other hand, arthroscopy was better at identifying defects in the articular cartilage as well as tears of the medial cranial meniscotibial ligament, which attaches the menisci to the bone.

The researchers conclude that, given the strength and limitations of each modality, the best evaluations of the stifle joint include the use of both arthroscopy and ultrasound.

Reference: "A comparison of arthroscopy to ultrasonography for identification of pathology of the equine stifle," *Equine Veterinary Journal,* November 2015



DUSTY PERIN



DUSTY PERIN

PAIN RELIEF COMMON AS A **DIAGNOSTIC TOOL**

In a recent survey of veterinarians conducted in the United Kingdom, the horse's response to pain-relieving medications was found to be the most commonly used diagnostic tool in cases of colic.

Researchers at the University of Nottingham sent questionnaires to 228 veterinarians asking about their first assessment of colic cases. The most frequent diagnostic test reported (87.2 percent) was "response to analgesia"—whether the horse's condition improved after the administration of pain-relieving medication. Rectal examination was the second most cited measure (75.9 percent) and nasogastric tubing was the third (43.8 percent).

Three other tests—abdominal paracentesis (also known as "belly taps"), bloodwork and ultrasound—rounded out the top diagnostic choices.

Despite the popularity of certain diagnostic techniques, the researchers note that there was a wide variation in individual protocols: For each diagnostic test there was at least one veterinarian who indicated they use it in 100 percent of cases and at least one who indicated they never use it.

This, the researchers say, highlights "the need for further evidence to support decision-making" when diagnosing cases of colic.

Reference: "Veterinary practitioners' selection of diagnostic tests for the primary evaluation of colic in the horse," ***Veterinary Record Open,*** **September 2015**

THE EFFECTS OF **MISMATCHED** BLOOD TRANSFUSIONS

Although a transfusion with the wrong blood type won't necessarily put a horse's life in jeopardy, it's still a good idea to seek a match, according to a study from the University of Pennsylvania's New Bolton Center.

In people, there are eight different blood types, determined by group (A, B, O and AB) and antigens[0] (known as the Rh factor). If a person receives blood with incompatible antigens, the resulting immune response can be deadly. For this reason, people are usually only given blood that matches their own type, and a test called cross-matching is done using the blood of both the donor and recipient prior to a transfusion.

By comparison, the procedure for administering blood transfusions to horses is simpler because mismatched blood types do not usually lead to severe adverse reactions. "Horses do not generally have the naturally occurring alloantibodies [antibodies against different blood types] the way humans and cats do," explains Rose Nolen-Walston, DVM. "The conventional wisdom was that they [only] needed to be cross-matched after the first transfusion because it was assumed that they would [then] make antibodies against the proteins on the transfused blood." There are eight major equine blood groups (A, C, D, K, P, Q, U and T) and nearly 30 equine antibody factors, making for a total of nearly 400,000 different combinations.

In a study to investigate the potential long-term impact of matching blood types for equine transfusions,

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Nolen-Walston first took blood samples from 20 healthy horses and determined their blood types. Then various samples were cross-matched to see whether clumping of blood cells or other signs of adverse reactions occurred. The degree of incompatibility was scored on a 0 to 4 scale. Based on this test, the horses were then paired as donors and recipients for two compatible and eight incompatible transfusions.

After the transfusions were performed, the horses were monitored for signs of reactions for five days. Among the eight who received transfusions with an incompatible blood type, seven developed mild signs of adverse reactions, including a low fever, increased heart rate and hives. None of the complications were life-threatening.

After any transfusion, a recipient's body eventually destroys the donor's blood and replaces with it with its own type. To determine how quickly this occurred in the study horses, the researchers drew blood from the recipient horses one hour after the transfusion and periodically for the next 35 days. They then tested each sample to determine how much donor blood was left.

"Horses can regenerate blood pretty quickly," says Nolen-Walston. "Within a week they are already mounting a good regenerative response. If a horse is given incompatible blood, it's possible that the blood would be destroyed so rapidly that the horse would develop dangerous anemia before the body had caught up and produced enough red blood cells to carry oxygen."

The data showed that in incompatible pairs, the new blood was destroyed seven times faster than in pairs that were compatible, with half of the transferred red blood cells absent three to five days later. In horses given blood that was matched, the decline was gradual, suggesting a lifespan of around 70 days for the transfused cells.

This, Nolen-Walston says, indicates that matched blood types result in longer benefits and sheds light on the potential risks of incompatible matches. She notes that "other studies have described horses having fatal reactions to incompatible blood, so it is possible, though rare. In this study, most of the incompatibilities were horses receiving blood type 'Ca,' whereas the more life-threatening reactions are more likely to be against type Aa and Qa blood."

Among eight horses who received transfusions with an incompatible blood type, seven developed mild signs of adverse reactions, including low fever, hives and increased heart rate.

Reference: "Survival time of cross-match incompatible red blood cells in adult horses," *Journal of Veterinary Internal Medicine*, November 2015

A NONINVASIVE FIX FOR **ESOPHAGEAL STRICTURES**

A simple, nonsurgical procedure can be used to successfully treat some esophageal strictures, according to a new study from the University of California–Davis.

An esophageal stricture is a narrowing of the esophagus with fibrous scar tissue that often occurs after a severe and prolonged episode of choke. Affected horses have difficulty swallowing, are more prone to recurrent choke and may develop pneumonia if food passes into the trachea[0] rather than the esophagus.

Surgery under general anesthesia has previously been used to correct esophageal strictures, but the California clinicians have been treating the condition using a less-invasive technique that requires only standing sedation. In esophageal balloon dilation, a balloon is inserted into the esophagus and inflated at the site of the stricture, creating pressure that gently breaks down the fibrous tissue and widens the opening. Corticosteroids can be administered after the procedure in an attempt to reduce inflammation.

In a retrospective study of nine horses whose strictures were treated with esophageal balloon dilation, the researchers found that five survived to be discharged from the hospital. At the time of the last follow-up, the horses had survived from two to 11 years and three were successfully fed hay-based diets. All of the four horses who did not survive were less than a year old and had concurrent medical problems, such as pneumonia.

Reference: "Endoscopic balloon dilation of esophageal strictures in nine horses," *Journal of Veterinary Internal Medicine,* July/August 2015



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By Christine Barakat with Melinda Freckleton, DVM

WINTER HOOF HAZARDS



In areas of the country where winter brings snowstorms and subzero temperatures, many horses end up enjoying an extended break from their usual arena work and/or trail outings. Remember, however, that your horse's hooves need attention even if he is taking it easy for a spell. Here are three conditions that can befall overlooked hooves in winter:

Hoof bruises: Frozen ground can be unforgiving, particularly on hooves that are normally shod but suddenly go barefoot for the season. If you don't want to leave your horse shod during a training break, consider using hoof boots for rides or short turnout sessions instead.

Imbalances: Overgrown hooves stress soft tissue structures in the foot and leg at any time of year, but long toes and low heels combined with choppy, frozen or muddy pastures put your horse's soundness at an even greater risk. Keep up with his regular trimming schedule to maintain proper hoof balance.

Thrush: When nasty weather keeps horses standing in stalls or stagnant mud, this smelly hoof infection can set in quickly. Be vigilant in both stall cleaning and daily hoof care over the winter months. Keep in mind that inactivity increases the risk of thrush, so take every opportunity for turnout this winter. Remember, a blanket or thick natural coat is sufficient to keep a horse warm even in frigid temperatures.

POP QUIZ

TELL ME WHERE IT HURTS

Q: In the interest of precision, veterinarians use anatomical directional terms when describing specific locations on a horse's body. Where would you look for the problems described below?

a. a wound on the medial aspect of the hock joint

b. swelling on the proximal portion of the cannon limb

c. insect bites on the ventral midline of the abdomen.

For the answers, see page 21.



ARND BRONKHORST

HOW'S YOUR **HAY SUPPLY** HOLDING UP?

February is a good month to check your hay stores to make sure you have enough to last the rest of the winter. Take stock of how many bales remain in your loft or shed and do some quick calculations based on how many flakes you are feeding daily.

If it looks as if you may run out of hay before spring pastures grow in, now is the time to take action. The easiest solution is to purchase more, if it's available. If good-quality hay is hard to find this late in the season, you may have to make some judgment calls. Hay that is a bit bleached or stemmy may be less nutritious but is fine to feed as a source of fiber. On the other hand, avoid buying moldy or dusty hay, no matter how scarce supplies may be.

If purchasing bales isn't an option, consider alternate roughage sources. Chopped hay, complete feeds, soaked beet pulp, or alfalfa cubes or pellets

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HANDS ON TIP
SPECIAL DELIVERY

A plastic sled works wonderfully for pulling hay out to horses over snow-covered terrain. A small "saucer" sled can take a few flakes, but the big "toboggan" types can easily handle an entire bale.—*Leslie Montague, Moorhead, Minnesota.*

Send your suggestions for inexpensive horse-care substitutes as well as hints for saving effort and time to Hands On, EQUUS, 656 Quince Orchard Road, #600, Gaithersburg, MD 20878; Fax: 301-990-9015; e-mail: EQLetters@EquiNetwork.com. Senders of published items will receive selected EQUUS *merchandise.*

are all good options. But don't wait until your hay runs out to make the switch—that can set your horse up for colic or other metabolic disturbances. Change your fiber sources as you would concentrates or other processed feeds—very gradually. Mix the old and new 50/50 for one week before switching over to the new source entirely. Then make a mental note to adjust next fall's hay order so you won't find yourself scrambling next year.

HELP YOUR HORSE **STAY WARM**

It sounds like an old wive's tale, but feeling your horse's ears is a good way to gauge whether he is cold. Remove your glove and gently cup an ear. If it's warm, chances are the rest of your horse is as well. If it feels cold, he may be having trouble staying warm. But don't use the "ear test" as your sole source of evidence about your horse's winter comfort—be on the lookout for other signs that he may be chilly.

Shivering is a sure sign that your horse is cold. Reflexive contractions of the muscles, shivering helps the body keep warm but at great metabolic cost. If you find a horse shivering, immediately help him warm up with a



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blanket or shelter. He is literally shivering pounds away, and he is just as uncomfortable as you would be if you were cold enough to shiver.

A horse who is losing weight over the winter is utilizing more calories than he is taking in. The first fix is to provide free-choice forage. Digesting hay provides a "slow burn" in the gut, warming the horse at his core. If your horse can't maintain his weight with an increased hay ration, consult with your veterinarian about increasing his grain or perhaps adding calories in the form of fat, such as corn oil, to his diet.

Although you don't want your horse to be cold, be careful to avoid putting too heavy a blanket on him. A horse who sweats under a blanket will become chilled, which can leave him even colder and at risk of serious illness. Err on the side of leaving him slightly chilled, blanketing for the warmest anticipated temperature of the day, not the coldest.

WHAT RELUCTANCE TO GO **DOWNHILL** MAY MEAN

When a normally eager trail mount suddenly balks at walking downhill, it's a clue that something is wrong physically. Descending an incline requires a horse to balance and brace himself with various parts of his body. Pain or dysfunction in any one of them can cause him to be less willing.

Reluctance to walk downhill could be a sign of navicular pain as the horse shifts more weight to his heels with each step. Similarly, a horse with ringbone[0] may experience more pain on a downhill stretch than he does on flat ground or an upward slope. Descending a hill can also be unpleasant for a horse with a sore neck—his discomfort may increase as he uses his neck for balance. In addition, an ill-fitting saddle can cause pain when a horse heads down a slope.

POP QUIZ **Answers**

a. a wound on the inside of the hock joint
b. swelling at the top of the cannon bone, near the knee
c. bites on the underside of the horse's belly, near the center of the body

A horse with a neurological condition may also hesitate to go down a hill. A common test for cervical stenosis (narrowing of the vertebrae to impinge on the spinal column) is to walk the horse downhill and carefully observe his feet. A horse who is uncoordinated may allow a hoof to "hover" for a few seconds before he sets it down with each stride. This is more easily detected when walking downhill and is more pronounced on steeper slopes. Eventually, the horse may refuse to walk downhill because his incoordination makes him feel unsafe.



"Saddled and bridled
and booted rode he,
A plume in his helmet,
A sword at his knee.
—"Bonnie George Campbell," traditional Scottish ballad

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Whether for riding, barn chores or going out on the town, equestrian footwear is always in vogue.



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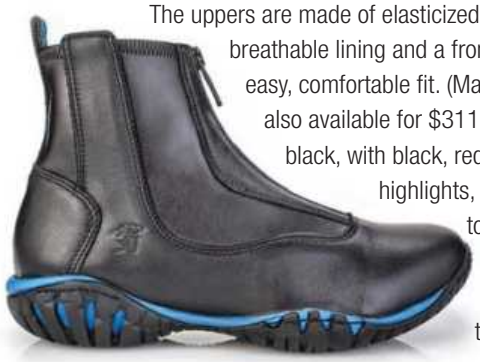
Stand up to the elements in the **Norse Women's Boot** (suggested retail, $195), from Gumleaf of England, an authentic English "wellie" handmade in Europe with 85 percent natural rubber for a softer, more comfortable fit that resists cracking, even after years of wear. The boots are completely waterproof and lined with neoprene for warmth, with a cushioned heel and forefoot and a nonslip, deep-tread outer sole. Available in fire-engine red, brilliant blue or basic black, in sizes EU 37 to 42 (roughly U.S. sizes 6 to 10). Visit www.gumleafUSA.com or call 1-844-486-5323.





The **Daisy Clipper Children's Side Zip Paddock Boot** (suggested retail, $79.99), from Huntley Equestrian, combines classic styling with a durable, easy-access brass side zipper. The boot is made of premium leather, with a moisture-wicking mesh inner lining, stretch elastic at the top for a comfortable fit, and a durable rubber outsole. Available in black, in sizes 12 to 5. Visit www.huntleyequestrian.com or call 855-295-6401.

To combine the best features of a hiking shoe and a riding boot, the **Walk&Ride Dynamik** (suggested retail, $383), from Sergio Grasso, offers a Vibram outer sole designed to adapt to the biomechanics of the foot while allowing for a sensitive feel and grip on the stirrup. The uppers are made of elasticized calfskin with a breathable lining and a front-zip fastener for an easy, comfortable fit. (Matching gaiters are also available for $311.) Available in black, with black, red, blue or orange highlights, in sizes EU 36 to 46. Visit www.sergiograsso.it to locate a dealer in the United States.



The **Blundstone Dress Series Boot** (suggested retail, $169.95), by Libonati Co., is the "casual dress" version of a classic work boot. The boot is made of premium leather with a steel shank for stability, a removable footbed, and a urethane outsole designed for durability. Available in six colors, in women's sizes 6 to 13 and men's 4 to 13. (Also available in a brogue style for $184.95.) Visit us.blundstone.com.



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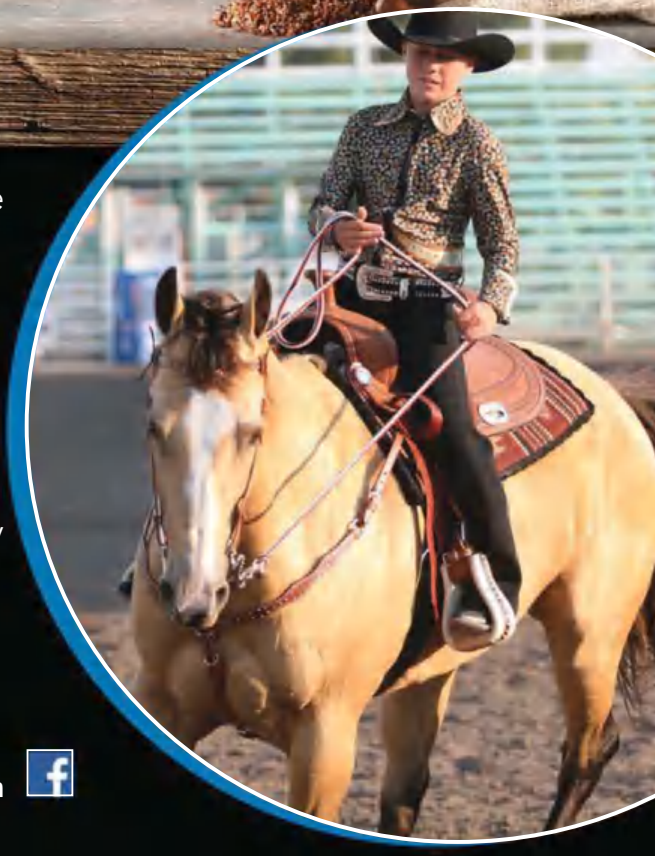
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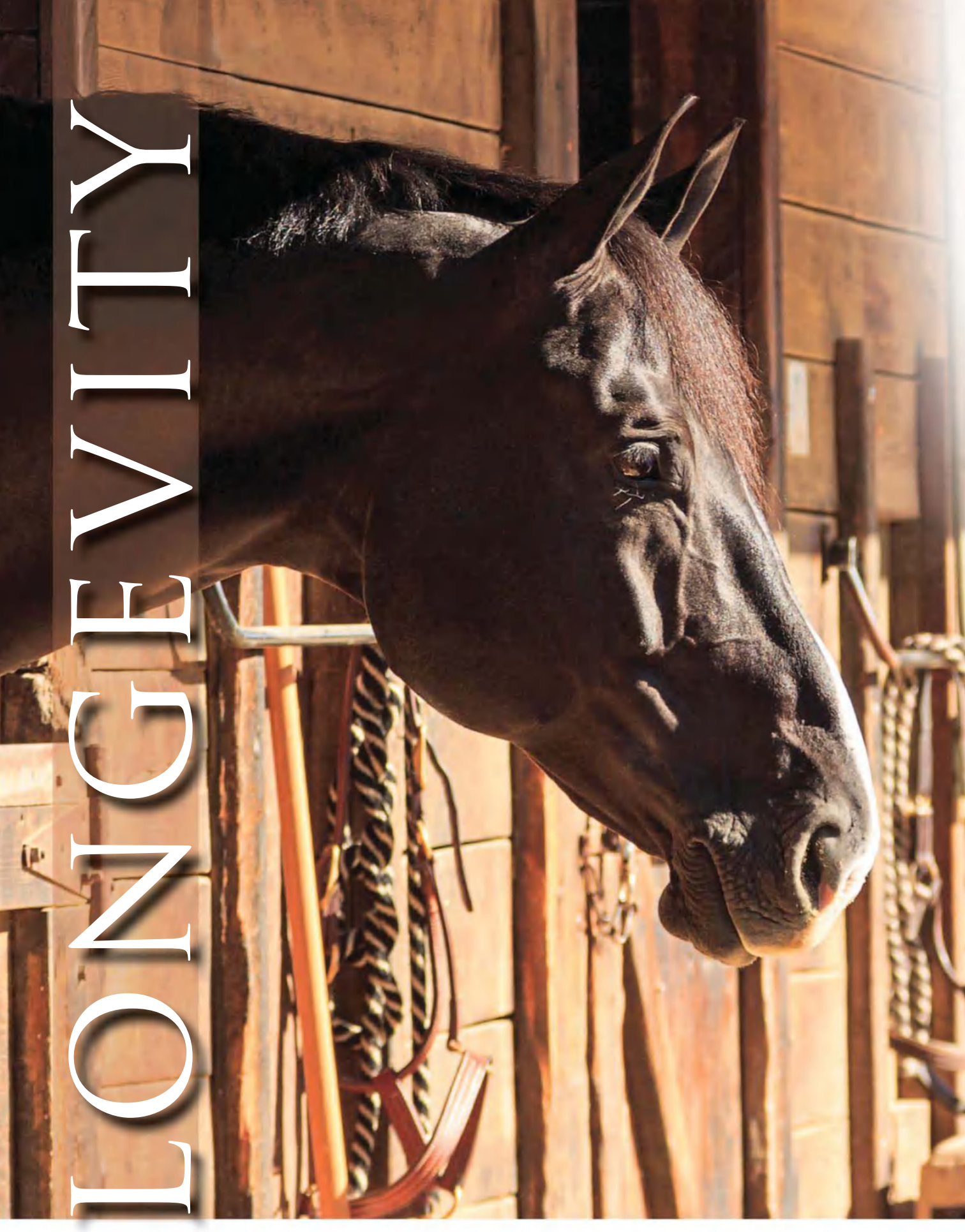
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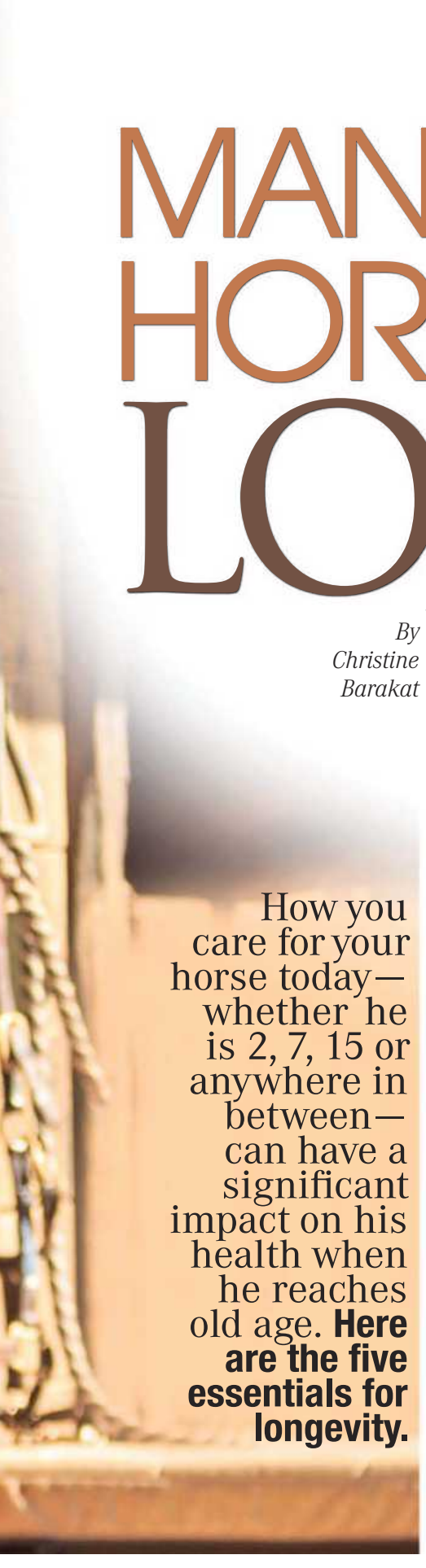
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LONGEVITY



MANAGE YOUR HORSE TO LIVE LONGER

By Christine Barakat



How you care for your horse today—whether he is 2, 7, 15 or anywhere in between—can have a significant impact on his health when he reaches old age. **Here are the five essentials for longevity.**

Statistics show that horses today on average live longer than they ever have in history. Modern disease prevention, parasite control, surgery and other advances mean that, with proper care, a horse has a good chance of living well into his 20s and perhaps beyond. But there are no guarantees. And it takes effort and forethought to help a horse stay active, healthy and happy as the years go by.

And now is the time to build a foundation for a long life. How you care for your horse today—whether he is 2, 7 or 15—can have a significant effect on his health and well-being in the years to come. In fact, the best time to make an investment in your horse's future is well before he begins to show signs of aging.

"The most common contributors to death in older horses—poor mobility, the inability to chew food and founder—are all things that can be prevented through proper care when the horse is young," says Robert Judd, DVM, of Hewitt, Texas.

If you acquire a horse when he's already elderly, there's no way to roll back the clock, of course, but if you have a younger horse, the actions you take now can make a significant difference down the road.

To increase your horse's chances of living a long and productive life, focus on five specific management areas—dental care, weight control, fitness, pituitary health and nutrition. To be sure, these don't encompass everything it takes to keep a horse healthy, but preventive care and vigilance in these areas pay the highest dividends in terms of longevity down the line.

CARE FOR HIS TEETH

To discover one of the principle causes of precipitous decline in aging horses, look no farther than the teeth. "When a horse's teeth go bad, things go downhill pretty quickly," says Chris Robertson, DVM, of Blue Mountain Equine in Madison, Virginia. "If he can't eat, he's not going to be able to take in sufficient calories and nutrients to support any of his vital systems. Honestly, I think advances in dental care are one of the primary reasons we are seeing horses today live longer than ever."

Missing or worn-down teeth can make it difficult for a horse to eat, but sometimes the source of trouble is hard to spot. "Any kind of inflammation

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can be a problem," says Judd. "Even if horses still have all their teeth, they can develop abscesses, and that chronic pain will cause a horse to stop eating and lose weight. Then they get weak and go down and can't get up again. I think that's a pretty common situation for an older horse."

Judd adds that seemingly unrelated health issues in older horses can often be traced back to dental problems. "You'll hear that an old horse died because he colicked, but that colic may have been an impaction caused by his inability to chew stemmy forage. Ultimately, the culprit was the teeth."

Judd recommends dental exams every six months for horses of all ages. "That doesn't mean you have to get something done to your horse's mouth every six months," says Judd. "Just an exam is fine, to ensure everything is on track. I might float a horse's teeth every year, maybe every two years, but I do want to look in his mouth every six months to catch problems early."

Seemingly unrelated health issues in older horses can often be traced back to dental problems.

In fact, says Judd, the earlier in a horse's life that you begin to evaluate his teeth the better. "A lost tooth doesn't happen overnight. That situation is years in the making," he says. "You will find abnormalities in young horses—for example, all their teeth don't erupt at the same time and the upper molars may not erupt as fully as the others. As a result, the opposing molars on the bottom may grow taller, putting excess pressure on the top teeth. This pressure is chronic and causes the upper teeth to 'cup' and weaken. This can lead to periodontal disease, sinus infections and tiny fractures that weaken the teeth over time. If this goes uncorrected, you're looking at significant problems by the time that horse is 25."

Robertson also makes a case for early intervention: "How often a horse needs to be floated depends a lot on the individual," he says. "But if you take a look annually and start maintenance work before things get bad, you'll make a huge difference in that horse's long-term health."

The alternative, he says, is to risk facing choices down the line that no one wants to make. "I get so many calls from people—and I really hate these calls—where they say, 'My horse is 25 years old, he's dropping hay and feed, and I think it's time to get his teeth done.' By that time it's too late to do anything," says Robertson. "If I had to advise someone on only one thing to keep their horse alive longer, I'd tell them to take care of his teeth."

GEVITY



WATCH HIS WEIGHT

As important as it is for a horse to receive adequate nutrition throughout his life, it's also important to keep him from getting fat. "If you want your horse to live a long time, don't let him get too heavy at any point in his life," says Robertson.

Obesity doesn't stress a horse's cardiac system as it can in people, but it presents another risk that is just as deadly. "Horses who are overweight, and especially those who stay that way, are at an increased risk of developing laminitis and founder," says Judd.

Potentially devastating inflammation of the sensitive laminae of the hooves, laminitis is often triggered—through a variety of mechanisms—by diets that are too rich. Founder is an internal deformity of the foot that occurs when weakened laminae can no longer support the coffin bone, allowing it to descend and rotate within the hoof. "If there's no rotation of the bone there's a chance the horse can fully recover," says Judd. "But when the laminae detach and the bone rotates, those attachments never fully heal. The horse is then prone to repeat episodes of founder for the rest of his life, oftentimes with less and less dietary triggers."

But, says Judd, the lingering effects of a single episode of founder can spell trouble down the road. "If a horse foundered when he was younger, he may always have a certain level of discomfort. Then, as he gets older, that worsens. Throw arthritis on top of that and you've got an old horse who is in too much pain to move. It's a common reason we end up putting older horses down."

Beyond founder, excess weight takes a toll on a horse's bones and joints. Over a lifetime, the wear and tear caused by carrying several hundred extra pounds can increase a horse's susceptibility to arthritis and other chronic degenerative bone diseases.

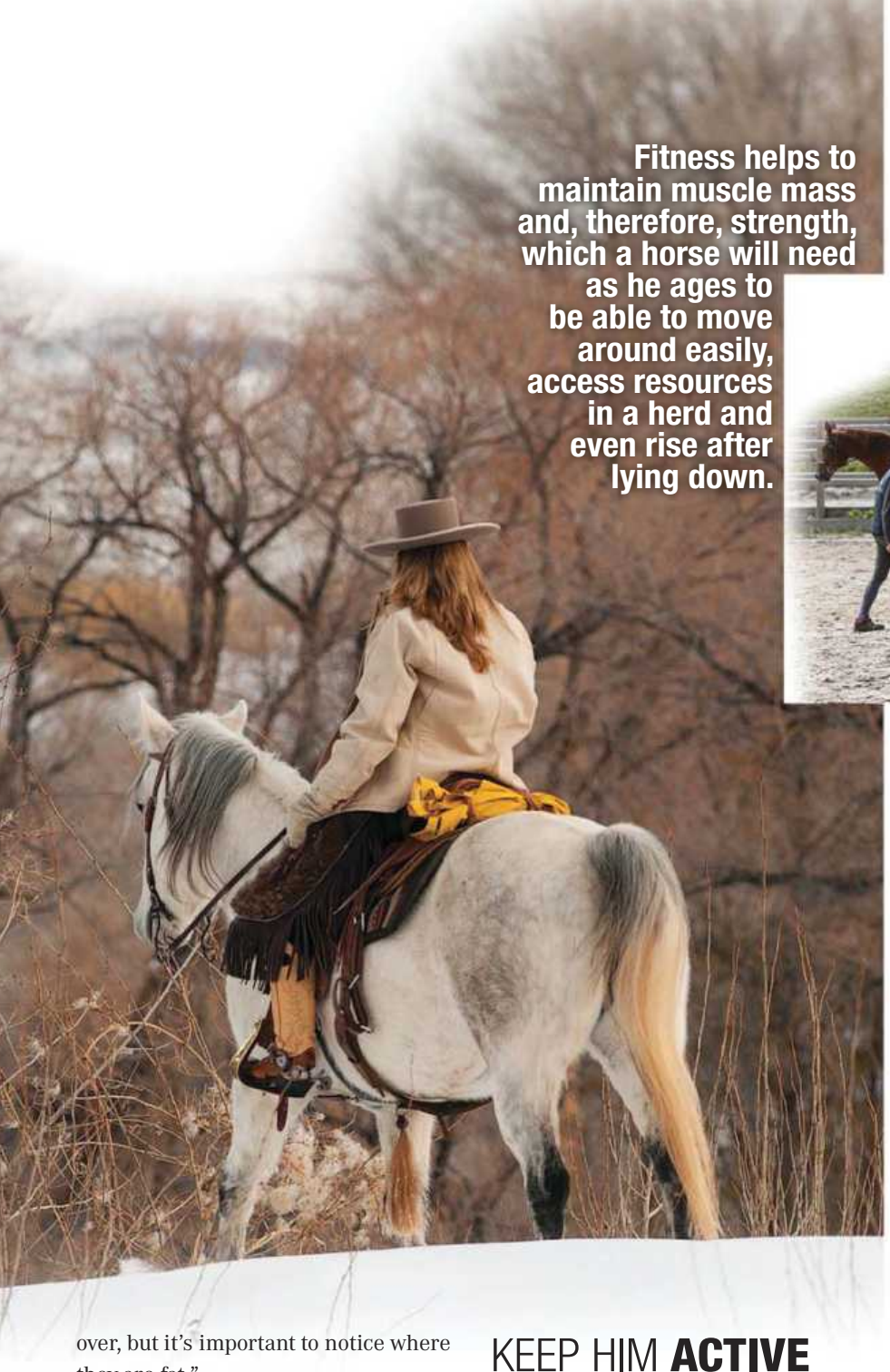
But you can head off these problems. Familiarize yourself with the body condition scoring (BCS) system and talk to your veterinarian about what your horse's ideal weight would be. And if he starts packing on the pounds, adjust his diet—you'll need to supply him with fewer calories than he is burning. A hay-based diet and plenty of exercise—both as turnout as well as ridden work—are the key to equine weight loss. This may mean outfitting your horse with a grazing muzzle during the spring and summer months or arranging to have someone else ride him when your own schedule keeps you from the saddle.

A horse doesn't have to be obviously obese to be at a high risk of laminitis, however. Those who have equine[0] metabolic syndrome or insulin[0] resistance are already at increased risk of laminitis because their bodies do not respond to insulin appropriately, leading to spikes in blood insulin levels after certain meals. Exactly how these spikes are related to laminitis is the subject of ongoing research.

Over a lifetime, the wear and tear caused by carrying several hundred extra pounds can increase a horse's susceptibility to arthritis and other chronic degenerative bone diseases.

Laboratory tests can identify horses with metabolic conditions definitively, but you may notice physical clues on your own. "These horses have fat deposits in very specific places, on the crest and over the tail, for instance," says Judd. "The horse may not be fat all

DUSTY PERIN



Fitness helps to maintain muscle mass and, therefore, strength, which a horse will need as he ages to be able to move around easily, access resources in a herd and even rise after lying down.



FRANK SORGE/ARND BRONKHORST PHOTOGRAPHY

over, but it's important to notice where they are fat."

Researchers believe that secretions from fat cells in these specific deposits trigger metabolic and insulin imbalances. Diet and exercise are usually the key to reducing these potentially troublesome accumulations of fat. Work with your veterinarian when managing a horse with a metabolic condition. If a standard weight-loss regimen does not help, there are medications that might.

KEEP HIM **ACTIVE**

Even if he's not overweight, a horse who is out of shape isn't likely to live as long as one who has been kept in good condition.

"Fitness extends a horse's life," says Rachel Buchholz, DVM, of Northwest Equine Performance in Mulino, Oregon. "It helps to maintain muscle mass and, therefore, strength. And a horse is going to need that strength as he ages to be able to move around easily, access resources in a herd and even rise after he lies down."

Fitness is much easier to maintain than achieve, adds Buchholz, which is important to remember well before a horse grows old. "If a horse spends his middle age years not doing much activity, and then when he's 17, someone decides he needs to get fit, they are going to have a much longer and potentially difficult road than if that horse was always kept in condition. Older, unfit horses are more likely to injure themselves and those injuries can heal slower than in a younger horse. It's far easier to just keep him in shape than to try and bring him back."

Of course, a horse who is very active is more likely to be injured than a pasture potato, but those risks can be managed to minimize their effects into his older years. "If you have a significant bone injury in a young horse, yes, that could lead to arthritic changes even after it's healed, which may be a management issue throughout the horse's life," says Buchholz. "But you can manage that with supplements, medications and even various joint injections when the time is right."

Soft tissue injuries in an equine athlete may never fully heal, but they can

CLIX PHOTOGRAPHY



PPID can be diagnosed with laboratory tests, but they need to be carefully timed and interpreted depending on the season of the year.

become a driver of a natural, and even useful, progression of a horse's career. "A horse who tears a suspensory, for instance, may not be able to go back to his previous level of work, but with the right rehabilitation program, he can return to a lower level of work and do well," says Buchholz. "And that can be beneficial for everyone: That's how we get kids' horses and experienced school horses who introduce novices to a sport. And the horse benefits by maintaining some level of activity, rather than just hanging out in a field all day, losing all his muscle mass and strength."

Buchholz emphasizes that "retirement" for a horse based purely on age or previous workload can have the opposite of the intended effect. "Turning a horse out after a busy career isn't a way to reward him or extend his life. If you go to the doctor at age 50, he's not going to tell you to just sit around on the couch from now on. It's the same with horses. They need to stay active as long as they can."

As for riding the older, healthy horse, "Go ahead and use him," says Buchholz. "But keep an eye on him. Regular checkups with your veterinarian are critical to making sure your horse is still benefiting from the level of work he's at." During these checkups, your veterinarian may recommend management changes to help keep your horse active, including joint or pain medications or even specialized shoeing.

"Hoof care is very important throughout a horse's life," says Buchholz. "Long toes and low heels can put extra stresses on the deep digital flexor tendon and other structures of the lower limb. If you're going to ride a horse throughout his life, you need to make sure his feet are kept in good shape."

And don't forget how much a horse benefits from being at liberty. "Turnout is a huge help to keeping all horses in good condition, but particularly the older guys," says Buchholz. "They will move around at will and keep themselves somewhat warmed up. If you sit around for a while, you're going to be stiff when you get up and start moving around. It's the same for older horses: If they are in a stall all day, when they do get out, they are going to be stiff and achy. If they can move around, they can avoid some of that."

WATCH FOR **HORMONAL IMBALANCES**

It's an unusual horse over the age of 20 who doesn't have some degree of pituitary pars intermedia dysfunction (PPID, also called Cushing's disease). PPID causes the pituitary gland to produce less dopamine, leading to excessive secretion of the hormone cortisol by the adrenal gland. This leads to a variety of physical changes, including a thick hair coat, abnormal sweating and increased thirst. Some of these, such as lowered immune function, muscle wasting and an increased risk of laminitis, can shorten a horse's life.

But as with so many other conditions, it's wise to consider the possibility of PPID well before old age sets in. "We think of Cushing's as a disease of older horses, but you need to be on watch for it in a horse's mid-teens," says Judd. "Some horses develop it at 14 or 15, and the earlier you can catch it and control it, the better. Even if they don't yet have an obviously thick coat, the condition is taking a toll on the horse, and you don't want to wait until the horse founders to consider the possibility he might have Cushing's."

Judd starts asking owners questions specific to PPID when horses are about

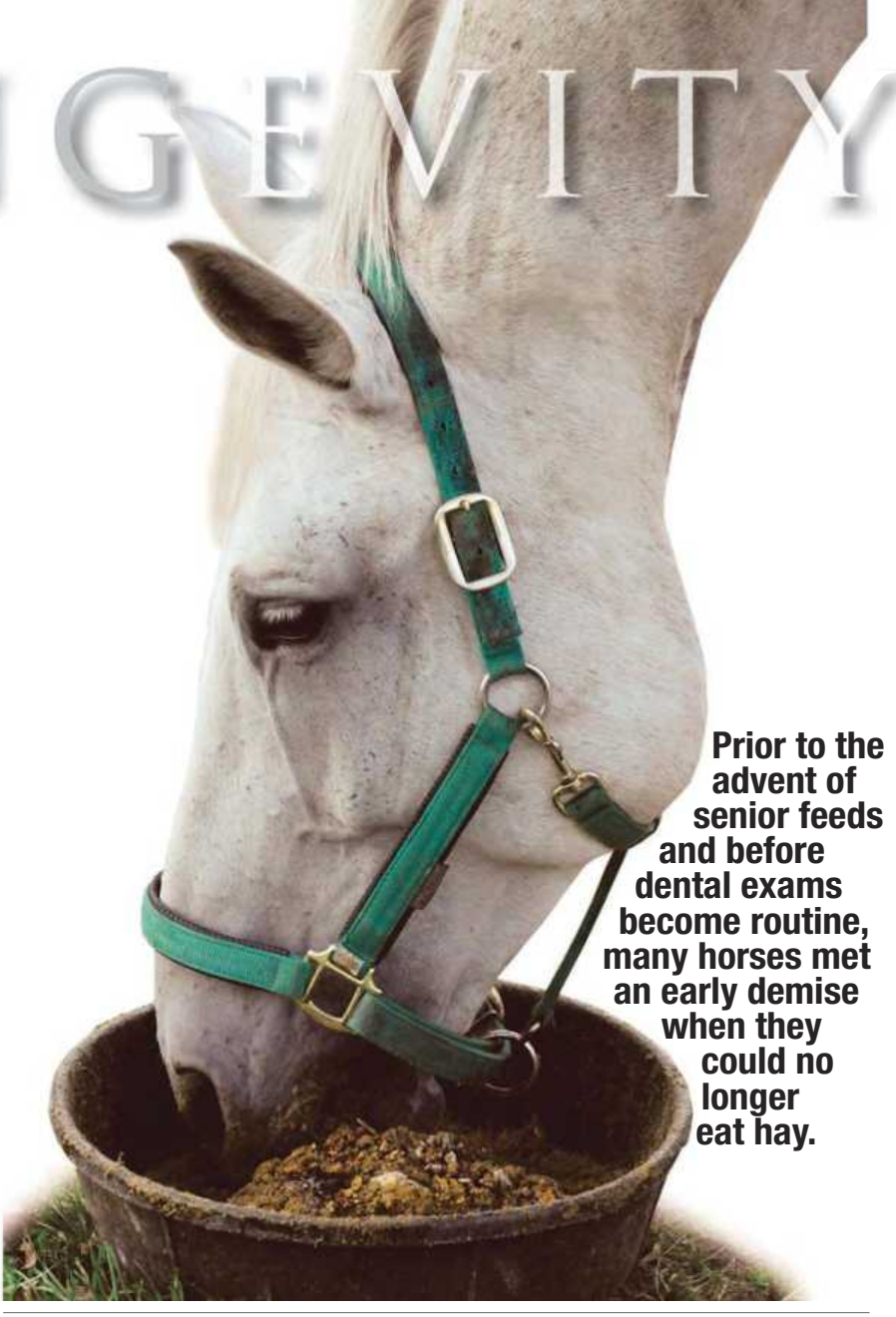
DUSTY PERIN

13 years old to detect early signs of the condition: "During a routine visit I'll ask if the horse is sweating strangely or how he's shedding. Definitely by age 18, I'll be asking this and paying close attention to the answers."

Robertson agrees that early detection is key. "I don't think we've gotten to the point where we need to test every 20-year-old horse for Cushing's as a matter of routine, but we definitely need to be on the lookout for it as the horse enters his later teens."

PPID can be diagnosed with laboratory tests, but they need to be carefully timed and interpreted depending on the season of the year. If a horse does have PPID, the drug pergolide (sold as Prascend) can control the condition by regulating the pituitary gland. Pergolide needs to be given daily for the duration of the horse's life, and you'll want to have regular veterinary visits to ensure the current dosage is still effective.

Controlling PPID goes beyond medication, however. Affected horses will also benefit from low-sugar and low-starch diets, regular dental and hoof care, and body clipping to keep their hair coat manageable.



Prior to the advent of senior feeds and before dental exams become routine, many horses met an early demise when they could no longer eat hay.

DUSTY PERIN

ADJUST HIS **DIET** AS HIS NEEDS **EVOLVE**

Your horse's nutritional needs will change as he ages and feeding him appropriately at each stage will keep him healthy in the moment while also laying the groundwork for a long life.

"The biggest challenge, I think, with equine nutrition is keeping them from getting too fat," says Judd. "I rarely see thin horses these days, particularly when they are younger and middle-aged. Usually the problem is too much nutrition."

Your horse doesn't need to eat a lot to receive the necessary nutrients to keep him healthy. Commercial feed mixes formulated for each stage of a horse's life will provide the necessary vitamins and minerals. Assuming he can chew it, picking the correct product and feeding it according to the label directions will ensure your horse gets the proper nutrition.

If he is such an easy keeper that grain provides too many calories even while he's in active work, you may need to go to a forage-only diet, which may require some supplementation. "If your horse is on a hay- or grass-only diet it's possible he's missing a vitamin or mineral, and a supplement could help," says Judd. "But you want to be sure before you start adding anything to his diet, so check with your veterinarian first."

As your horse ages, even with a lifetime of proper dental care, he may gradually lose the ability to chew effectively. This can lead to weight loss and associated muscle wasting and weakness. In this situation, a senior feed can help keep him healthy.

"For horses who do lose some of their dental function and can't chew hay, senior feeds are fantastic," says Robertson. "Prior to the advent of senior feeds and dentistry becoming

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ARTHRITIS: INEVITABLE BUT NOT UNTREATABLE

Good management can head off or lessen the effects of many age-related health issues, but there's not much you can do to keep a horse from developing arthritis.

"Much like in people, arthritic changes in horses are an inevitable part of aging," says David Frisbie, DVM, PhD, of Colorado State University.

A horse's genetics and lifestyle have some influence on how well his joints function as he ages. But there's no escaping the basic wear and tear that eventually leads the inflammation that normally assists in joint healing and maintenance to outpace the body's restorative abilities. The result is a destructive cascade of processes that lead to deterioration of the joints: arthritis.

Even if joint problems can't entirely be prevented, however, there are things you can do to slow the progression of arthritis and alleviate the discomfort it causes. Treatments for horses with arthritis range from feed supplements to intensive, high-tech therapies. The best choice for a particular horse depends on many factors, including his age, activity level and the severity of the case. Current therapies include:

• **Dietary supplements.** A variety of joint support supplements are available. Formulated to aid healing and encourage growth of healthy tissue, many also have anti-inflammatory effects. Most contain some combination of substances naturally found in healthy joints, including glucosamine, chondroitin sulfate, polysulfated glycosaminoglycans (PSGAGs) and hyaluronan. Other common ingredients include methylsulfonylmethane (MSM), yucca, avocado-soybean unsaponifiable (ASU) extract and vitamin C.

• **NSAIDs.** Drugs such as phenylbutazone both relieve pain and interrupt the inflammatory process, which can break the cycle of cartilage degradation. Oral NSAIDs can be administered as pills, powders or pastes, but long-term use can sometimes lead to side effects such as gastric ulcers. Newer products that selectively inhibit only the COX-2 enzymes promise pain relief with fewer side effects. Another option is to apply a topical product over the affected joints.

• **Injections.** Corticosteroids are potent anti-inflammatory agents that can be injected directly into the joint space to produce immediate pain relief as well as to slow progression of the disease. However, corticosteroids can have side effects, including laminitis, and any injection into the joint poses risks, such as infection. Hyaluronan can be administered either into the joint or intravenously to support joint health. It seems to have an anti-inflammatory effect and to stimulate the body to produce more, better quality synovial fluid. PSGAGs can also be injected into the joint or intramuscularly. These also encourage healing of cartilage and are thought to have an anti-inflammatory effect.

• **IRAP (interleukin-1 receptor antagonist protein) therapy.** In this procedure, blood is drawn from the horse and treated to stimulate the production of IRAP, which blocks a protein that accelerates joint damage. The serum is then injected back into the same horse's joint.

• **Stem-cell therapy.** This cutting-edge treatment harvests undifferentiated cells from the horse's own body tissues, usually fat or bone marrow, and injects them back into the damaged joint to create new cartilage cells.

Whatever other treatments your veterinarian suggests, she is likely to also recommend exercise, at whatever level your horse can manage. "We know a consistent level of exercise seems to help," says Frisbie. "This helps keep good muscle strength, which supports the joints and allows less laxity."

routine, the early demise of horses was usually when they could no longer eat hay. That's when they began to decline; they would get thin and weak and that was the end of it. Senior feeds, however, along with pelletized alfalfa and beet pulp provide fiber in an easily chewed and digested form."

Don't look to the calendar to decide when to alter a horse's diet with a senior feed or alternative form of fiber. "The time to do it is when you notice them dropping balls of hay or find unchewed feed in their manure," says Robertson. "And certainly when you see their weight dropping off. This can happen in their early 20s, but it can also happen in their later teens."

The later years of a horse's life can be bittersweet. You treasure your old friend, but there's always worry about when his health will decline to the point when hard decisions will need to be made. If you've taken steps throughout his life to preserve his health into old age, however, those golden years can be many, and much sweeter.

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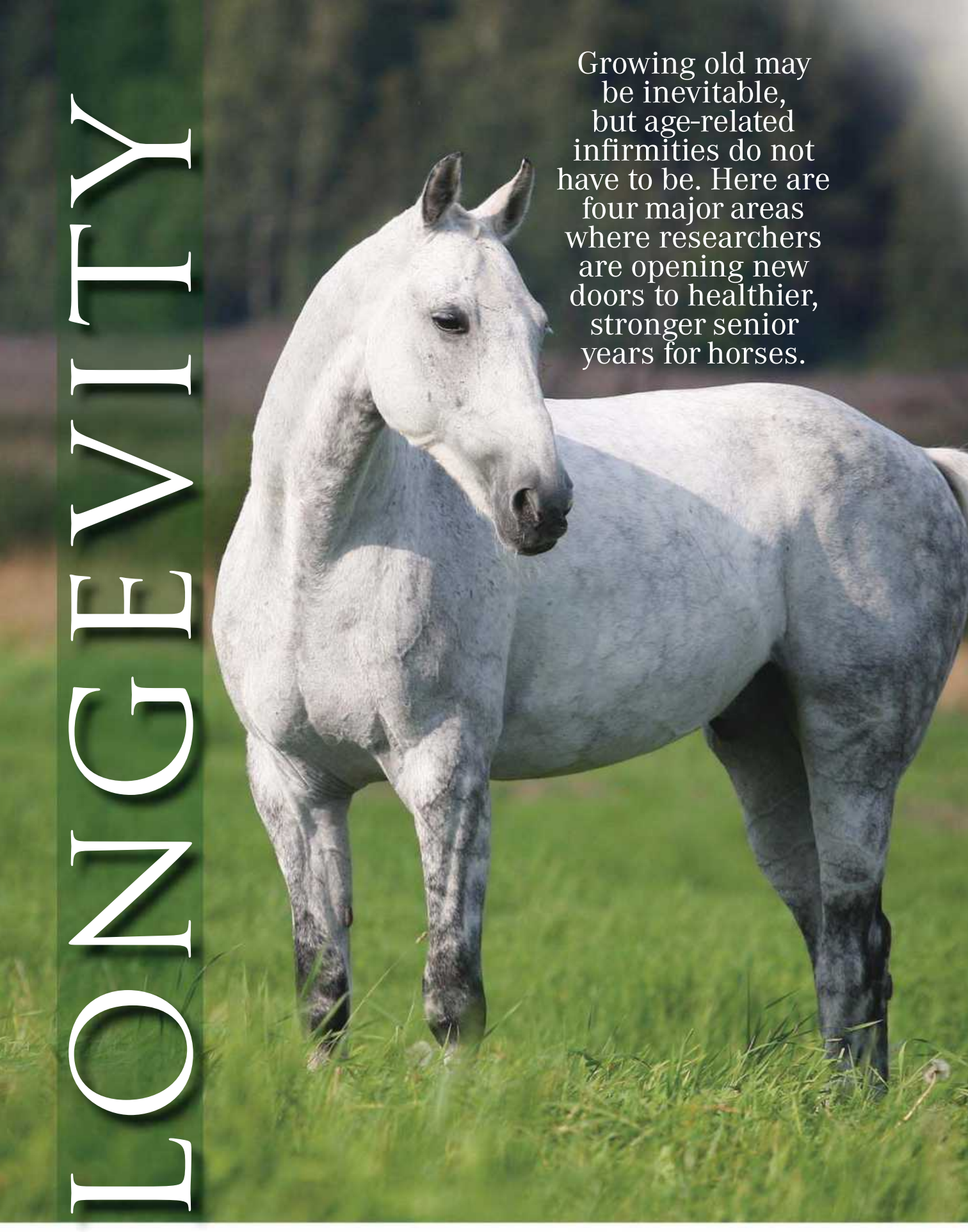
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LONGEVITY

Growing old may be inevitable, but age-related infirmities do not have to be. Here are four major areas where researchers are opening new doors to healthier, stronger senior years for horses.



THE SCIENCE OF AGING





By Heather Smith Thomas

To be alive is to age. It's one trait we share with every living thing on Earth, and have since the dawn of time. And yet, the process of aging remains one of the great mysteries of biology.

In people as well as animals, researchers are still struggling to understand why organisms age and what happens inside of their bodies as they grow older. The questions are legion: Why do some people remain active and alert at 100, while others decline and pass away decades earlier? Why do some animals, such as giant tortoises and bowhead whales, count their lives in centuries while so many other species survive only a handful of years? And, ultimately, what can we do about it? Can the effects of aging be reversed or be made less debilitating?

Already, horses today have longer lives than they did just a few decades ago—and they tend to be healthier late in life. But there is more work to be done. Researchers continue to investigate how the passage of time affects the function of cells, immunity and metabolic processes.

Ultimately, this work may yield information that helps us care for horses in ways that maximize their longevity, but much remains to be learned. "It would be nice to have some biomarkers of aging that would be helpful to the owner—to know how well or not well their horse is aging," says Amanda Adams, PhD, of the Gluck Equine Research Center at the University of Kentucky. "This is an interesting but challenging area of research."

Still, studies conducted at Gluck as well as Rutgers University in New Jersey and other research centers around the world are yielding insights into aging that are already beginning to offer new possibilities for keeping our horses sounder and more comfortable into their later years. And opportunities for better care will likely only improve in the years to come. "Our mission is to improve the health and well-being of the horse," says Adams.

For now, here are four ways that aging affects a horse's body—along with the best available advice on how to help him grow old gracefully.

EKATERINA DRUZ/ARND BRONKHORST PHOTOGRAPHY

LONGEVITY

1. CHRONIC INFLAMMATION

One of the more significant changes in an aging body is the occurrence of chronic, low-grade inflammation, a phenomenon called inflamm-aging. "Unlike acute inflammation, chronic inflammation is not resolved within minutes or hours but involves immune responses and cytokine production contributing to this mild, persistent inflammatory process that leads to tissue degeneration," explains Adams.

In people, this chronic inflammation is believed to be related to a host of ailments that become more common with advancing age, such as osteoarthritis, heart disease, diabetes, changes in body composition, energy production and utilization, metabolic homeostasis, immunosenescence, neuronal health and certain cancers. In horses, inflamm-aging may play a role in the development of many conditions, including arthritis, inflammatory airway diseases, Cushing's and insulin resistance.

Then again, inflamm-aging may simply be a side effect of these conditions—its causes and effects are still not understood. "This low-grade, chronic inflammatory process occurs with increasing age, and we don't know why," says Adams. "There are several theories, and one is that chronic antigenic stimulation over the years has basically worn out the immune system. There is breakdown in the signaling pathways that may contribute to the inflamm-aging that occurs with age, and we are trying to understand what may or may not contribute to this, and what it means for the horse."

Researchers are investigating how diet, hormones and other factors may influence this phenomenon. "Maybe there's a nutritional component, or some



HORSE: ARND BRONKHORST; INFLAMMATION ILLUSTRATION: DNA ILLUSTRATIONS/PHOTORESEARCHERS.COM

kind of lack in nutrients as we age that contributes to the inflamm-aging response," Adams says. "Is there a connection between pituitary pars intermedia dysfunction [PPID, also called Cushing's disease] and inflamm-aging? Is there an association between loss of muscle mass and inflamm-aging? It's been shown in human studies that with increasing age there is loss of muscle mass, and we've also seen this in horses: Older horses with higher levels of inflamm-aging have more muscle loss. We are also looking at whether inflamm-aging contributes to any of the arthritis problems that older horses are faced with."

• A SEASONAL EFFECT? One study from Gluck produced some surprising results, suggesting that inflamm-aging may be influenced by changes in season. "We are looking at the impact of the seasons on immune response, such as T-cell proliferation responses and inflamm-aging responses, because we found significant impacts of season in both young and old horses on these immune responses," says Adams. "The seasonal research components came out of an unrelated eight-month study in which we were sampling the horses monthly and found some changes we weren't expecting. We found much different levels of inflammation than we did the month before. We examined everything closely and nothing had changed—except the season."

That finding led to further investigation. "We designed a study with the primary focus to examine the effect of season on immune responses in horses," Adams says. "We just finished this year-long research and were able to measure differences in immune responses with season in both young and older horses. The inflammation levels peak in spring and drop during late summer months through winter and then come back up in the spring." With this said, she adds that there was still an age-associated increase of inflammation or inflamm-aging.

It is not yet known what, if any, effects these findings might have on a horse's health. "We are trying to understand if there is any crosstalk with the hormone responses because we know that season also affects hormone production," Adams says. "We are looking at whether we can modulate the rise and fall in inflammation."

• OBESITY CONNECTION Not surprisingly, research suggests that excessive weight may play a role in the development of chronic inflammation. In fact, obese older horses have been found to have higher frequencies of lymphocytes and monocytes that produce inflammatory cytokines than do thinner older horses, suggesting that increased fat levels contribute to inflamm-aging. Reducing the body weight and fat tissue in these older horses significantly reduced the levels of inflammatory agents.

• PRACTICAL IMPLICATIONS It might seem obvious that you'd reduce inflammation with nonsteroidal anti-inflammatory drugs (NSAIDs), but scientists are not yet ready to make that recommendation. "We have conducted in vitro [laboratory] studies and, yes, have found that polyphenols and NSAIDs can modify or have a significant effect on inflamm-aging, but we have yet to conduct in vivo, or in-the-horse, studies, so at this time we cannot make any recommendations on which of the natural anti-inflammatory products may be helpful to the old horse," says Adams. "We hope to know more of these answers soon."

Long-term, low doses of NSAIDs are sometimes prescribed to control arthritis pain in older horses, but in part due to the risk of side effects, for now at least they are not recommended for horses without specific medical needs.

Many equine supplements, especially those formulated to support healthy joints, contain ingredients with anti-inflammatory properties. These include glucosamine, avocado soybean unsaponifiables (ASU), hyaluronan (HA), MSM (methylsulfonylmethane) and omega-3 fatty acids as well as herbals such as yucca, devil's claw and grape seed extract. The effects, if any, of supplements like these on chronic, low-level inflammation are not yet known, but generally, these products fall into the category of "can't hurt; might help." More research is needed to answer the unknowns.

It does seem clear, however, that if a horse is overweight, reducing his excess body fat will help limit his pro-inflammatory factors and keep him healthier overall. If your aging horse is overweight, talk to your veterinarian about an appropriate diet and exercise plan to help him lose extra pounds.

2. REDUCED IMMUNITY

An inevitable effect of aging is immunosenescence, the technical term for a decline in immune function, which leads to greater vulnerability to illness and infection. "There is breakdown in the actual function of immune cells," says Adams. "One of the things research has shown is that there is reduced T-cell function—there are fewer T-cells to undergo proliferation."

T-cells, or T-lymphocytes, are a type of white blood cell integral to immune function. When T-cells encounter a foreign pathogen for the first time, they multiply rapidly and release large

numbers of proteins called cytokines that attract other immune cells to help neutralize the threat. After the infection subsides, a certain number of T-cells "remember" how to quickly create new antibodies to respond to that antigen.

"We have a small pool of those 'memory cells' that remain in our lymph nodes and lymphatic system in other areas of the body. These cells are very important because whenever the body is faced with an invasion by viruses or bacteria, this small pool of cells has to undergo proliferation to divide and form more cells—to make that pool larger so they can take care of the infection," Adams explains.

"If this can't happen at an optimal rate or level, the animal might succumb to the infection, or it might take the body longer to recover from infections," she adds. "There is more chance for secondary infections to occur, especially if the primary infection is viral, like influenza. The horse may develop secondary bacterial infections."

• VACCINATION EFFICACY

One consequence of this reduced immune activity is that older horses may not get the full protective effect of vaccinations. "If we have a breakdown in immune responses to vaccination, the horse is at risk—especially if he is still being shown and exposed to other horses," Adams says. "More specifically, duration of immunity post-vaccination may be different for an older horse compared to younger horses. A hallmark characteristic of immunosenescence is reduced responsiveness to vaccination as well as to infectious agents, and this is one of the things our research has been and is currently looking at," she adds. "A lot of work has been done showing how horses respond to equine influenza vaccination. It's been shown that older horses



HORSE: DUSTY PERIN; CELLS ILLUSTRATION: GARY CARLSON/PHOTORESEARCHERS.COM

have reduced responses, but not much work has been done to show how they respond to other vaccines such as West Nile virus. So we are looking at this, and also—based on human medicine—at how horses respond to different formulations of vaccine." That is, aging horses may have different responses to various types of vaccines—modified-live virus versus killed vaccines, for example.

"In addition we are looking at how endocrinopathies such as PPID affect immune responses to vaccination," Adams says. "About 30 percent of aged horses are affected by equine Cushing's, and we know that this plays a role in suppressing or changing immune function. There has not been much work done yet in comparing PPID horses with non-PPID age-matched control horses and how their immune systems may or may not be different, and how they respond to vaccinations, but we are currently working on this."

These studies have so far yielded some intriguing and unexpected results. "We do see some changes in how some PPID horses respond to vaccinations, but not as much as we thought we would. We performed a study looking at how PPID horses respond immunologically to a multivalent vaccine so we could look at different immune responses to different antigens. The PPID horses did not respond any differently to the influenza component of the vaccine, but there were some differences in how they responded to the herpesvirus and the West Nile components," Adams says.

"The PPID horses' antibody titers dropped. So we measured their immune responses post-vaccination and based on preliminary analysis we found that the PPID horses didn't hold their antibody titers as long as the non-PPID horses. This is something we are investigating further."

• PARASITE CONTROL CHALLENGE Another significant aspect of a horse's immune function involves internal parasites. Young horses develop immunity to ascarids and other internal parasites as they mature, but does a weakening immune system mean older horses might again become more vulnerable? "We recently conducted an experiment to evaluate whether old horses demonstrate statistically higher fecal egg counts, compared to middle-aged adult horses, and to investigate systemic expression of pro-inflammatory cytokines in old and middle-aged horses treated with different dewormers," says Adams.

The researchers found that the older horses did have significantly higher fecal egg counts than the middle-aged adults, and egg counts declined in both groups following deworming. "We wanted to measure immune responses post-deworming, but we didn't see anything as dramatic as we thought we would, although we didn't measure some of the immune responses important for parasite resistance," Adams says. "We were mainly wanting to see if there were differences in fecal egg counts, and how older horses respond to dewormers."

• PRACTICAL IMPLICATIONS Ask your veterinarian to review your aged horse's vaccination schedule. "If you own an older, at-risk horse this might mean potentially vaccinating more often, but you'd want to work with your veterinarian regarding how often," says Adams. For example, she adds, "A person might think about boosting that horse with West Nile vaccine at six months rather than just annually, especially in a region with a long mosquito season."

Likewise, take extra care with your parasite control program. Perform fecal egg counts to determine when to deworm and which type of anthelmintic to use.

Finally, consider implementing some additional measures to protect old horses from illnesses and infections. Simple biosecurity and hygiene measures are a good start. You may want to keep the older "homebodies" separate from horses who travel to shows and other public venues, and it's always a good idea to keep a separate set of buckets, tack and grooming tools for each horse in your care.

If your older horse still competes, consider spraying down his showgrounds stall with a disinfectant before placing him in it. Also, avoid sharing buckets, tack or tools with others, and don't let anyone borrow yours. Discourage visitors from petting your horse, and don't let him have nose-to-nose contact with other horses.

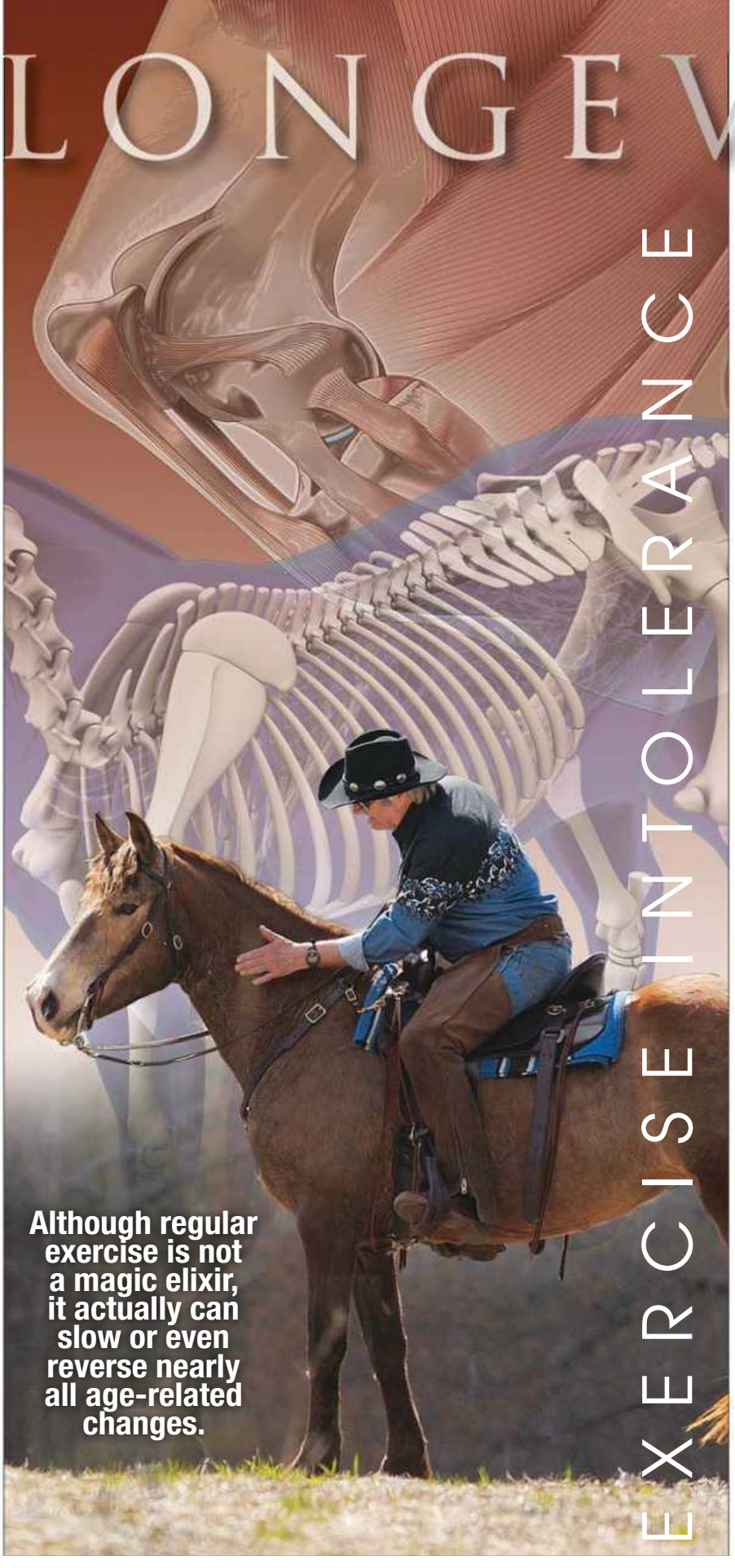
3. EXERCISE INTOLERANCE

You probably don't need researchers to tell you that the body's athletic capabilities diminish with age. But striving to understand exactly how and why that happens may help improve a horse's quality of life. "We have shown that aerobic capacity does decline with age," says Karyn Malinowski, PhD, director of the Rutgers Equine Science Center at Rutgers University. "[We've] done many studies on the use of exercise and exercise training/conditioning, trying to ameliorate some of the negative effects of aging."

One of the more significant aging-related changes is hormonal in origin. "We have shown changes in the hypothalamic-pituitary-adrenal axis [HPAA] in that cortisol[0] response post-exercise is lower in the old horse

LONGEVITY

EXERCISE INTOLERANCE



Although regular exercise is not a magic elixir, it actually can slow or even reverse nearly all age-related changes.

HORSE: CLIX PHOTOGRAPHY

compared to the younger horse," says Malinowski. The HPAA is a network of feedback interactions among three glands: the hypothalamus, the pituitary and the adrenals. Hormones secreted from each gland stimulate the secretion of additional hormones from the others, and together these hormonal fluctuations help to regulate processes including digestion, immunity and physiological responses to stress.

"Nettie Liburt, a graduate student in our lab, identified the place where the system was broken, and it was at the level of the adrenal gland," says Malinowski. "Corticotropin-releasing factor is still released from the hypothalamus, and ACTH [adrenocorticotropic hormone] is still released from the pituitary in normal amounts, but the adrenal gland cannot respond. This has a huge implication for metabolic response to exercise because glycogen[0] stores are mobilized from the liver in response to cortisol. So the older horse can't refuel his skeletal muscles as quickly as a younger horse can. And since cortisol has a very strong anti-inflammatory effect in pain management, the older horse is at a disadvantage. Since the anti-inflammatory properties of cortisol are missing, as well as the fuel mobilization properties from cortisol stimulation, the older horse cannot recover from exercise as quickly as the younger horse." As a result, the older horse will be stiffer and more sore than a younger horse who does a comparable amount of exercise.

Chronic inflammation also appears to have an effect on an aging horse's response to exercise. "Interleukin-1 beta is a general inflammatory cytokine that you want to see rise after exercise," says Malinowski. "What we saw in the older horse is that this response is reduced or blunted. This has implications for recovery from acute exercise. An older horse can't recover as quickly as a younger one."


30-YEAR-OLD PAINT


30-YEAR-OLD STANDARDBRED


23-YEAR-OLD ARABIAN

HORSES: DUSTY PERIN

HOW **OLD** IS **"OLD"**?

Horses no longer do the heaviest work in our world, and with attentive care, they can live much, much longer than did their ancestors in pre-industrial times. If horses are "not overdriven or overworked … they are capable of full work until they are twenty years old," wrote veterinarian J. Russell Manning, MD, VS, in *Manning's Horse Book,* a veterinary manual published in 1882. "How many arrive at this age? Not one in fifty. The most of them die under seven years old."

Nowadays, when it's not uncommon for horses to live well into their 30s, we are left with a relatively new question: When does a horse begin the transition from middle-aged to old age? Current research into aging has given us an answer that, surprisingly, aligns with Manning's:

"My colleagues and I decided at a workshop on geriatric horses in 2010 that we define a horse as old starting at age 20," says Karyn Malinowski, PhD, director of the Rutgers Equine Science Center at Rutgers University. "Horses in their middle teens are still in their prime. Our work has repeatedly shown that horses in performance careers like dressage and show jumping don't show downhill signs until they are in their 20s."

Of course, individuals may vary. "We have found a linear increase in chronic, low-grade inflammation with increasing age, up to a point," says Amanda Adams, PhD, of the Gluck Equine Research Center at the University of Kentucky. "We evaluated horses from 1 year of age up to 20 years old, then looked at a larger group of horses that were 20 to 30 years old. We saw a linear increase in systemic inflammation from age 1 to 20, but once the horses reached 20 it changed. There was no linear relationship from age 20 onward. You might have a 25-year-old horse that has a great deal of inflammation, and other 25-year-old horses that do not have as much, and look more like 10-year-olds."

"The older horses that have higher levels of inflammation—are they the ones with increased muscle loss or joint breakdowns?" asks Adams. "Are there any associations with any of this? We are working on answers to these questions. What does inflamm-aging mean and tell us about how horses age. We have mostly Thoroughbreds [due to our location here in Kentucky] but there doesn't seem to be a breed-related tendency on these. More work is needed."

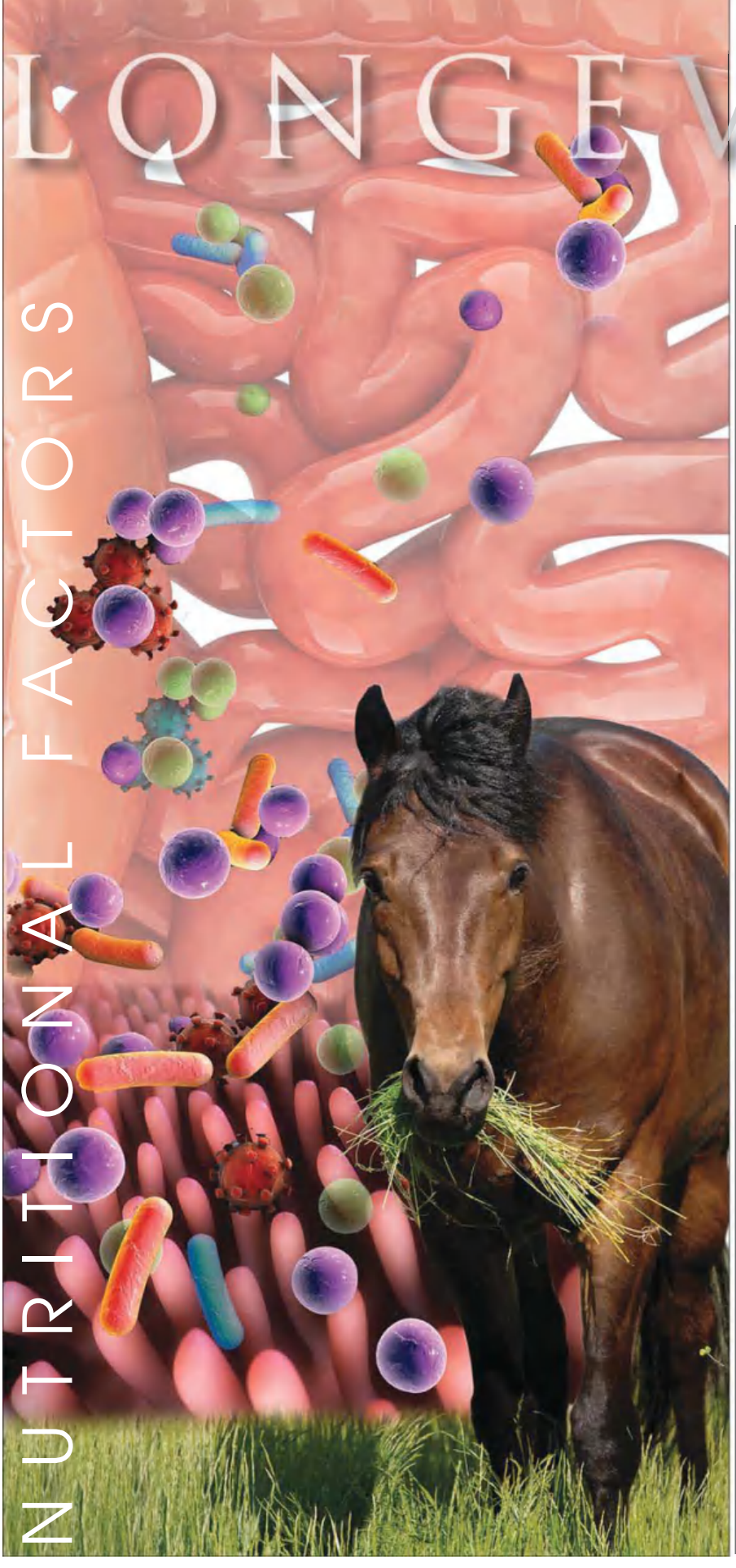
• PRACTICAL IMPLICATIONS Although regular exercise is not a magic elixir, it actually can slow or even reverse nearly all age-related changes. "You can actually start to restore insulin sensitivity, and restore a bit more health to the immune system, and can certainly change the HPAA axis and have a bit more response to exercise in cortisol concentration post-exercise. The only thing that we didn't see a positive response from exercise was in immune response," says Malinowski. "The group of horses we were studying here had an average age of 27, so they truly were older horses. You can still increase aerobic capacity and reduce body fat in an older horse with exercise conditioning and training. Exercise is a great thing for a senior horse's health."

If your aging horse has always been fit and seems to be doing well, there's no need to change his exercise regimen, though you'll want to keep his advancing years in mind. That may mean easing back on the amount of intense work in favor of longer, slower rides, as well as giving him more time to recover and rest after exertion. Icing or cold hosing your horse's legs after rides can ease inflammation and reduce his stiffness in the long run.

Also, be particularly careful to avoid allowing him to overheat. Another effect of aging is a decline in the body's capacity for thermoregulation, which is the process of heating and cooling to maintain its core temperature. Older horses will overheat more readily when they exercise, and they may take longer to cool off after working in hotter weather. Avoiding riding during the hottest parts of the day, and even on moderately warm days be prepared to hose and scrape down your horse to help him cool and recover more quickly.

Above all, keep your old horse as active as possible for as long as possible. Ask your veterinarian for guidance on the best program for an older horse who is overweight, unfit, arthritic or has other lameness issues. But keep in mind that exercise tends to be beneficial in most cases.

"People who keep their older horses in stalls and do nothing with them are not doing them a favor. These older horses need to be outside and moving," says Malinowski. "We can help reduce percent body fat, body weight and



HORSE: DUSTY PERIN; DIGESTIVE ELEMENTS: SHUTTERSTOCK.COM

decrease the discomfort from arthritis. We haven't done joint taps to look at arthritis, but from just watching old horses work on the treadmill and then turning them out, you know they feel better. They are running around and bucking and having a great time. The next day, they are waiting by the gate wanting to come in for their next session!"

4. NUTRITIONAL FACTORS

One of the newer fields of study in aging is nutritional immunology—which examines how foods might influence immune function and inflamm-aging. We tend to focus on the role the gut plays in digestion, but the entire lining of the gastrointestinal tract, as well as the liver, is populated with specialized immune cells, collectively called gut-associated lymphoid tissue (GALT). In fact, by some estimates in other species, upwards of 60 to 70 percent of the immune system is located in the gut. So it would make sense that the nutrients a horse eats, or lacks, might influence the functions of those immune cells. Further, the interaction between the gut microbiota and the immune system is important to consider. Healthy gut microbes may mean a healthy immune system.

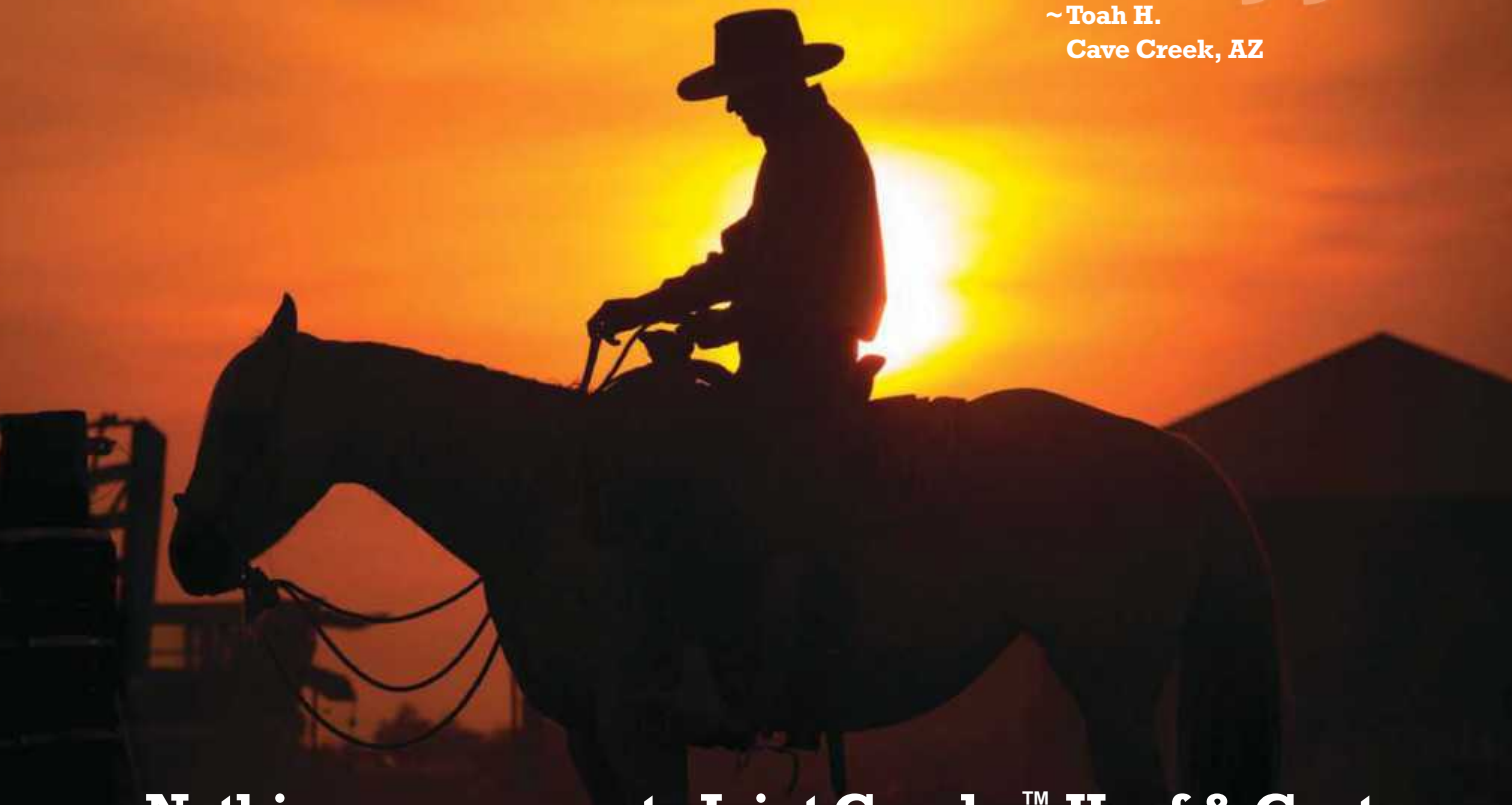
Researchers are only just beginning to investigate these links, and some results have been promising.

"We are looking at whether we can improve immune responses to vaccination and modulate the inflamm-aging responses with nutrition," says Adams. "We have shown some positive changes—such as our work with probiotics and prebiotics."

In a couple of studies done in collaboration with Purina Animal Health, administering prebiotics—nutrients that not only have immunomodulatory

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HOW **STRESS** MAY HELP

Heat-shock proteins (HSPs), also called stress proteins, are present in every cell of every organism, where they serve multiple functions. One role of certain HSPs, called chaperones, is to protect against stress.

"Heat-shock proteins are a new area in human medicine and rodent science," says Karyn Malinowski, PhD, of Rutgers University. "They appear after an insult to the body and are called 'heat-shock proteins' because the initial studies were conducted by exposing research subjects to high temperatures. When a body is dipped into hot water or exposed to heat, the concentration of these proteins increase. We now know that they respond to any insult, such as a change in energy homeostasis, heat, response to exercise, etc. Their role is to bring the body back to balance."

Early studies of HSPs in human medicine have shown some positive results. "Some of the human work has shown that diabetic patients who are insulin resistant can be helped by simply having a warm bath once a week," says Malinowski. "Putting them in a hot tub or warm bath will increase heat-shock protein concentration, and the secondary effect is that the body then becomes less insulin resistant. Insulin sensitivity goes up. Heat-shock proteins are involved in insulin response."

Investigations into HSPs in horses have also yielded some interesting observations. "Heat-shock proteins are altered by acute exercise in both young and older horses, but there is a significant difference," says

activities but also encourage the growth or activity of beneficial microorganisms in the gut—improved the responses of older horses to vaccines. "We did measure some improved immune responses to vaccination and some reduced inflammation," says Adams. "Nutritional changes helped a little, and we were excited."

Adams and other researchers are continuing to explore how various nutrients and dietary supplements influence a horse's inflammation and immune status. "We are looking at the impact of plant-based immunomodulators like the polyphenol compounds [curcumin, quercetin, etc.] that are being used in human medicine," she says. "We've done an in vitro study where we compared incubating immune cells [from old horses] with these different compounds. We stimulate these cells and look at how much inflammation they can produce in the presence of each compound. We also had some samples set up with bute and Banamine in vitro and found that several of these compounds

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***Riding Through Thick and Thin: Make Peace with Your Body and Banish Self-Doubt — In and Out of the Saddle* by Melinda Folse**

Regardless of seat size, riding discipline, or the degree — or even truth — of the body issues with which they struggle, the scars on female self-image in our society run deep and wide. So with the humor and big-sisterly swagger that readers and reviewers have come to love, Melinda Folse, author of bestseller *The Smart Woman's Guide to Midlife Horses*, has decided to step in with a delightful, insightful, fulfilling new book.

Riding Through Thick and Thin delves to the bottom of the issues that have long held women hostage, bringing together experts, research, resources and stories to encourage, inspire and empower. Readers will find some answers that may surprise them: Believe it or not, this is not about losing weight or getting fit (although if that's a point of interest, there's a section packed with helpful tools and ideas). This book is more about what's going on in every woman's mind — and it taps new findings in neuroscience to reveal that permanent change to deeply ingrained body image issues is not only possible, but it may be much easier than we think. **Paperback, 432 pp., $24.95**

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Malinowski. "In the older horses heat-shock protein response was significantly lower. Even though it did rise after exercise, there was an age difference."

How these observations might translate into better care for our horses is not yet known, but Malinowski can speculate: "Exercise is necessary for older horses," she says. "One of the possible therapies in the future for older horses might be heated water in the underwater treadmill. The heat would probably increase heat-shock proteins in the older horse. Walking slowly in the warm water might have a very positive response in these horses."

were able to reduce inflammation very similarly to bute or Banamine. In fact, some of them were better at it than these drugs."

Eventually, studies like these may lead to alternative methods of treating inflammation that would not run the risk of the side effects drugs like bute and Banamine can cause. "Most owners would love to be able to put their older horses on something that is safe and works in terms of reducing inflammation and perhaps improving any lameness or soreness due to age-associated arthritis," says Adams. "We were excited to show that some of these compounds are very good at reducing inflammation in vitro, and we're hoping now to do more in vivo work looking at some of these compounds in aged horses. We want to see if any have the potential to modulate inflammation."

• PRACTICAL IMPLICATIONS

Specific dietary recommendations based on nutritional immunology are still on the horizon. But we do know that horses benefit from some added nutrients.

"For older horses it's a good idea to supplement with certain vitamins," says equine nutritionist Shannon Pratt-Phillips, PhD, of North Carolina State University. "Many people supplement their senior horses with vitamin E and/or fish oil [for the DHA and other omega-3 fatty acids]."

Another common supplement, which is also included in many senior feeds, is vitamin C. Normally, horses manufacture all the vitamin C they need in their livers. However, says Pratt-Phillips, "A study found that older horses had lower vitamin C status. It is unknown whether the older horses are deficient because they can't make their own vitamin C as well anymore, or whether they have a higher turnover because they are older and have more inflammatory processes going on in the body. Perhaps the older horse simply needs more vitamin C and this is why the status is low."

Horses who remain healthy and active well into their 30s are common these days—many can continue to perform well in a number of disciplines. As we learn more about how their bodies age, perhaps we'll find more and better ways to keep them going strong for years to come.



LONGEVITY



The length of a horse's life doesn't determine his legacy. Here are eight organizations—inspired by particular horses—that will benefit others for generations to come.

By Emily Goldman







LIVING MEMORY



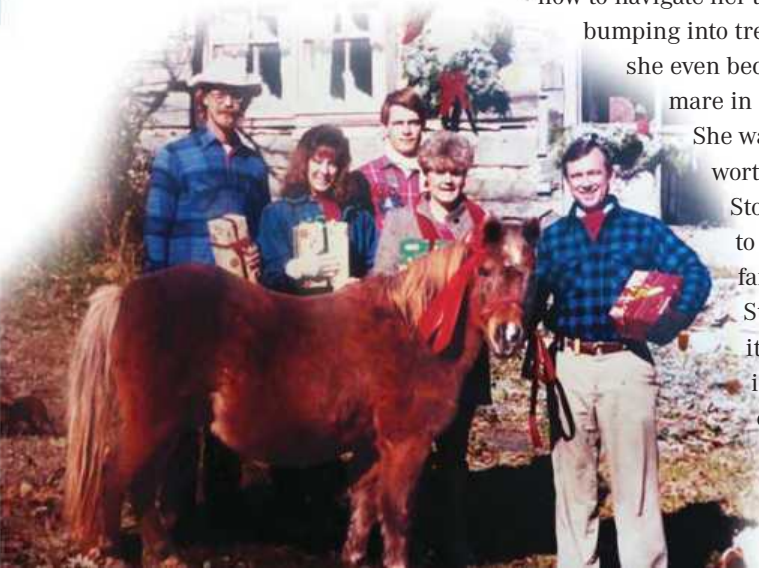
SECOND CHANCE RANCH

Hope for blind horses

When Emilie Storch, PhD, was diagnosed with multiple sclerosis almost 10 years ago, her entire world was shaken. A practicing psychologist as well as an author, mother of three and a motivational speaker, Storch had a busy and successful life. But, suddenly, her illness left her partially bedridden.

Then came Flurry. A friend gave the little Appaloosa to Storch shortly after her diagnosis, but there was a catch: Flurry was blind.

Still, Flurry coped surprisingly well in her new home. She quickly learned how to navigate her turnout area without bumping into trees or fences, and she even became the dominant mare in a three-horse herd. She was also a trustworthy companion for Storch, who was able to ride her around the farm. Flurry showed Storch that "a disability is not an inability," and that her life could still be full of love and enjoyment despite her disease.



"Flurry gave me hope that I could have a second chance at life." Storch said. "She had a disability and it didn't stop her at all." But just three months after her arrival, Flurry died. Storch was devastated. And she was further saddened when she learned how many other blind horses are sold for slaughter. "A blind horse had given me a reason to keep going," Storch recalls. "I knew I had to do something." So she did.



FLURRY

Storch founded a rescue she called Flurry's Hope to take in unwanted blind horses who are otherwise healthy and rideable. In an effort to keep more of them in their original homes, she also educates owners of horses who are losing their sight to help them make the transition safely.



RICHARD STONE REEVES

Flurry's Hope is now located at Second Chance Ranch in Madison, North Carolina. The ranch is currently home to 16 blind horses, with two more coming soon—all of whom will have comfortable and fulfilling lives because of Flurry. *For more information go to secondchanceranchnc.com.*

THE EXCELLER FUND

Saving ex-racehorses from slaughter

In the history books, Exceller is listed as the only horse in history to defeat two Triple Crown winners in one race: Seattle Slew and Affirmed in the 1978 Jockey Club Gold Cup at Belmont Park in New York. But today the handsome bay colt, who won $1,654,003 racing from 1975 to 1979, is mainly remembered for raising the public's awareness of how uncertain a racehorse's future can be.

Exceller was retired to stud in Kentucky in 1980 and was eventually sold to a breeder in Sweden. In 1997, at the end of his breeding career, he was killed in a slaughterhouse.

The Internet was a relatively new phenomenon in the mid-1990s, and bulletin boards and other networking sites were connecting people together in great numbers for the first time. The news of Exceller's death spread quickly among racing fans, most of whom were outraged and appalled to discover that his fate was not uncommon for ex-racehorses.

Bonnie Mizrahi learned of Exceller's story while browsing a message board frequented by fellow racing fans. She was both sad and outraged. "How he died hit me like a sucker punch in the gut," she says. "I was horrified to learn that his grisly fate was occurring every week to Thoroughbreds." She had to do something.

Mizrahi and a group of like-minded racing fans got together and organized The Exceller Fund—each promised to donate $15 per month to a Thoroughbred rescue organization in memory of Exceller and all of the other Thoroughbreds sent to slaughter. Mizrahi, who had some previous experience working with nonprofits, also began raising funds through eBay auctions.

Today, The Exceller Fund, which is based in Lexington, Kentucky, is a certified 501(c)3 organization that acquires Thoroughbreds at risk for slaughter; those who might be adoptable are trained for second careers, while others are provided sanctuary for life. Horses are kept at 15 private farms and therapy programs in eight states, which house about 50 horses at any given time, while The Exceller Fund pays for their care. Mizrahi, who still serves on the Board of Directors, also helped create alliances with other Thoroughbred rescues, such as CANTER and Old Friends, to save as many horses as possible. True to its origins, The Exceller Fund is still organized around individual members who pledge a minimum of $15 per month to help the horses.

"There is no quit in a Thoroughbred," says Mizrahi. "So why should we quit on them?" *For more information, go to www.excellerfund.org.*



UNITED IN LIGHT

A refuge for gentle giants

Deborah Derr, DC, was a Southern California chiropractor who served both people and animals when she met a horse who would change her life.

One of Derr's patients introduced her to Jedi, a 10-year-old, 19-hand Percheron who had just been rescued. The gelding was in need of special handling. "He had tremendous injuries and would jump a foot away from me as I touched his withers," Derr says. "He also had many whip marks across his skin."

Derr began working with Jedi, and the more time she spent with him, the calmer he became. I was working on his "body, mind and soul," she says, but perhaps "it was he who was working on my mind, body, and soul! I can't really explain the connection he and I had. Looking back it was almost a secret agreement he and I had made lifetimes ago."



LIGHTS ON BROADWAY

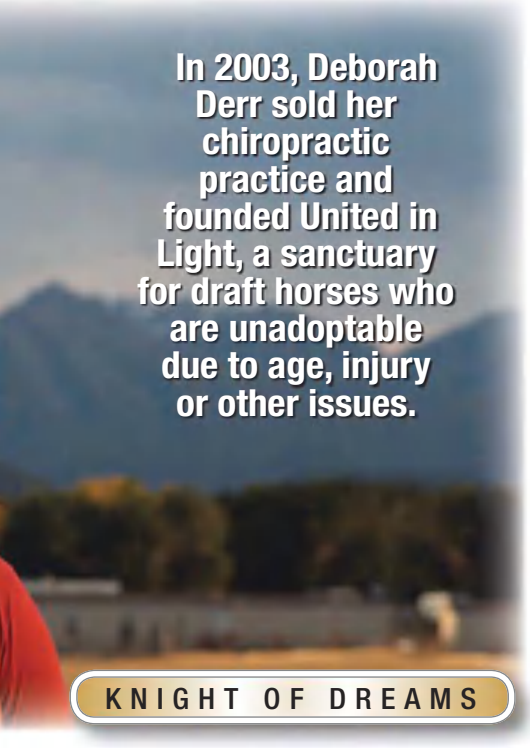
TERRI CAGE

One day while working on him, Derr says, "I took the time to linger and love on him. And as I closed my eyes two visions came to me: One was seeing Jedi, all cleaned up, brilliant looking, strong and healthy, and the second was standing in a grass pasture surrounded by 20 or more gentle giants."

Moved by her vision, Derr purchased Jedi from her client and renamed him Knight of Dreams. In 2003, she sold her chiropractic practice and founded United in Light, a sanctuary for draft horses who are unadoptable due to age, injury or other issues. The organization also helps connect adoptable draft horses with suitable homes.

Derr relocated United in Light to Livingston, Montana, in 2007. Currently, 11 horses live on the 10-acre sanctuary. Knight of Dreams passed away in July 2013. "His message, spirit and soul are still amongst us each day here," says Derr. "I am so grateful for the whispers of a draft horse called Knight of Dreams."

For more information, go to www.draftrescue.com.



In 2003, Deborah Derr sold her chiropractic practice and founded United in Light, a sanctuary for draft horses who are unadoptable due to age, injury or other issues.

KNIGHT OF DREAMS

REMEMBER ME RESCUE

Retraining racehorses for a better future

Lights on Broadway was "a kind, gentle soul who stood a towering 17 hands tall," says Donna Keen of the chestnut Thoroughbred who would change her life. "He didn't have a mean bone in his gigantic body, and he loved everyone he met."

After some success—Lights had been the 2001 Texas Horse of the Year—the gelding's racing career had waned by 2008, and he was at risk of being sent for slaughter. A group called Fans of Barbaro raised enough money to purchase Lights for his asking price of $3,000, and Donna and her husband, Dallas Keen, volunteered to foster and retrain him for free until he could be adopted.

Instead, Lights became Donna's personal horse—she rode him in demonstrations and could jump him bridleless. Keen says his kind personality and athleticism were a huge attraction to their farm. "Everyone who visited

DANIEL WOODS

wanted to meet Lights," she says.

Still, Lights' journey from champion to cheap claimer "weighed heavy on our hearts," Keen says. The Keens had always retrained retired racehorses on a small scale, but after meeting Lights in 2008, they knew they had to do more, founding the Remember Me Rescue, based in Burleson, Texas.

Although the inspiration succumbed to colic in August 2014, the Remember Me Rescue continues on in his honor, taking in retired racehorses. Care and rehabilitation is provided to horses who need it, and all are eventually retrained for new careers before being offered for adoption.

For more information, go to www.teamkeen.com.

Today, Friends of Ferdinand operates a retraining and adoption program for donated racehorses, which are kept at their facility in Dayton, Ohio, as well as in foster homes.

FRIENDS OF FERDINAND

New homes for retired racehorses

In his relatively short life, Ferdinand came to represent both the best and worst of the horse racing industry. The chestnut colt won the Kentucky Derby and placed second in the Preakness Stakes in 1986, and he went on to be named Horse of the Year in 1987. But, later, after he failed to distinguish himself as a sire, Ferdinand was exported to a breeding farm in Japan and lost to obscurity. When members of the Keck family, his breeders and original owners, tried to track down Ferdinand, they learned that the champion had been sent to a slaughterhouse sometime in 2002.

The news horrified racing fans throughout the United States, including two horsemen from Indiana, who were moved to found an organization they called Friends of Ferdinand to save other racehorses from that fate.



Today, Friends of Ferdinand operates a retraining and adoption program for donated racehorses, which are kept at their facility in Dayton, Ohio, as well as in foster homes. Potential adopters undergo a strenuous screening process to ensure good matches with available horses, a process that pays off, says Sara Busbice, current president of Friends of Ferdinand. "Our return rate on horses—because they are not a good match—is zero percent," Busbice says. "Taking time allows people to make good decisions."

Retraining the horses can be intensive, and many are taken to local shows, hunter trials and cross-country schooling events before they are offered for adoption. "We are trying to send the message that [retired racehorses] are very rideable, competitive mounts, not problem horses," Busbice says.

For more information, go to www.friendsofferdinand.com.

NETPOSSE

Bringing home stolen horses

Debi Metcalfe knew something was wrong when she walked into her pasture and called for her horse, Idaho, on the morning of September 26, 1997. "Idaho demanded attention," says Metcalfe. But on that day, the mare was nowhere to be seen. At first, Metcalfe and her husband Harold thought maybe she had jumped a fence. With the help of some neighbors, they searched the local area but found no sign of the missing mare. Alarmed, they called the police, and during the officer's visit, they found where the pasture fence had been cut. A horse's footprints led out of the pasture and ended abruptly at a set of tire tracks.

Idaho had been stolen. It felt like



IDAHO

MAXANN CROTTS HARVEY

their own child had been taken, says Metcalfe. But the local police had few resources to deal with stolen horses, the Metcalfes were told, and they realized that if they wanted to get Idaho back, they would have to find her themselves.

So began a yearlong odyssey. The Metcalfes contacted and visited sales barns, auctions and horse traders all over North Carolina and Tennessee. They posted thousands of flyers and talked to hundreds of people. They also discovered that Idaho's story wasn't uncommon. In fact, about the same time their mare was stolen, six other horses in surrounding counties had disappeared, too—one per county. The thieves were well aware that police in neighboring jurisdictions rarely share information, so no one would notice the trend.

At every step, the Metcalfes received help from volunteers who reported possible sightings, followed up on tips and even donated money for more flyers. Finally, a woman who had seen a flyer called in a tip—one that paid off. Idaho had been found.

But the 51 weeks that Idaho had been missing had been traumatic for the Metcalfe family, and Debi was determined that no other horse owner should have to go through this ordeal alone, so in 1998 she founded Stolen Horse International, also known as NetPosse. The organization offers a range of assistance for victims of theft, including an Alert System that notifies law enforcement, the news media, and a network of volunteers when a horse is reported stolen or missing. NetPosse also educates horse owners and offers tips for preventing theft in the first place. Thefts of other livestock as well as trailers, tack and equipment can also be reported.

Thanks to the efforts of Debi Metcalfe and all of the NetPosse volunteers, thousands of stolen horses have been returned to their rightful owners—and it all started with Idaho. "We are who we are today because of her," Metcalfe says. "She changed our lives."

For more information, go to www.netposse.com.

THE REFRIGERATOR FUND FOR EQUINE HEAD TRAUMA

Seeking to make head injuries less devastating

Refrigerator dominated Quarter Horse racing between 1990 and 1995. The bay gelding won 22 of 36 races and earned $2,126,309—an all-time-high earnings record that remained unbroken until 2010. But the gelding retired from the track young, sound and energetic, so his owners, Jim and Marilyn Helzer, set a new goal for him: to become an AQHA Supreme Champion—a title awarded to a horse who reaches high-performance speeds in racing and also earns points in halter classes and two different performance classes,

PHOTOS BY Z



REFRIGERATOR

earning at least two Grand Championships. Only 51 horses have earned this award in the open division since it was introduced in 1966.

Working toward that goal in February 1999, the then-11-year-old, in training to compete in roping, sustained a head injury in a freak accident. He was put down a few days later.

Devastated over their loss, the Helzers endowed the Refrigerator Fund for Equine Head Trauma through the American Quarter Horse Association. The Fund raises money that is awarded as grants to researchers doing work targeted toward "prevention, treatment, diagnostics and hospitalization or prognosis" of head injury trauma.

Between 2000 and 2005, the Helzers personally matched contributions of up to $20,000 per year. Today, the endowment holds over $316,000 and has already funded two research studies, one at Ohio State University and another at Cornell University.

For more information go to www.aqha.com/foundation.

ANIMAL HEALTH FOUNDATION

Research for the prevention and treatment of laminitis

Donald Walsh was a third-year veterinary student at the University of Missouri Equine Clinic when a pony named Sugar Bear was brought in. The owner happened to be a good friend of Walsh's who had recently purchased the gelding for his 6-year-old daughter.



SUGAR BEAR 2

TINA SHINKLE

They'd noticed that the pony had difficulty walking, and his hooves were oddly shaped.

The veterinary team took x-rays of Sugar Bear's hooves, which revealed founder, severe rotation of the coffin bones that occurs as a result of laminitis. The pony would most likely be in pain for the rest of his life, and the clinician told Walsh that they would have to put him down.

"I didn't know what to say—I was shocked," Walsh recalls. "As a third-year vet student you're hoping you're going to cure everything, then when the first animal walks in, they say, 'Put it down.' It was baffling why we couldn't do anything."

Walsh never forgot that feeling of helplessness as he graduated with his veterinary degree in 1969 and went into private practice. Over the years he continued to see many patients with laminitis, and he was continually frustrated at how many he had to put down. Laminitis, the inflammation of the soft connective tissues within the hoof, and founder, the detachment of the coffin bone from the hoof wall, were poorly understood. Horses like Sugar Bear were crippled and dying in tremendous pain, and little research was being done.

In 1984, Walsh, along with a group of his clients, founded a nonprofit organization called the Animal Health Foundation to raise money for laminitis research. Since then, the AHF has provided a total of over $1.8 million in research grants to universities in the United States and Australia.

Walsh still thinks about Sugar Bear to this day. The pony most likely developed laminitis as a result of equine metabolic syndrome, a disorder that can lead to elevated levels of insulin in the bloodstream and is now known to be the most common cause of this foot disease. Today, a pony with this disorder could be diagnosed early, and with a carefully managed diet and exercise, he might never develop laminitis. And even if he did, his veterinarian could employ several strategies to help prevent founder.

"I doubt we would have to put this pony to sleep today," says Walsh.

For more information, go to www.ahf-laminitis.org.

These eight organizations are just a beginning. Thanks to rescues and nonprofit organizations all over the nation, thousands of horses are living better lives because a small number of people were moved to dedicate their lives to helping them. Most rely on volunteers, foster homes and donations to get their work done. If you're interested in helping horses like yours, consider getting in touch with an organization near you. You'll find a directory of equine welfare organizations at www.horse-welfare.org.

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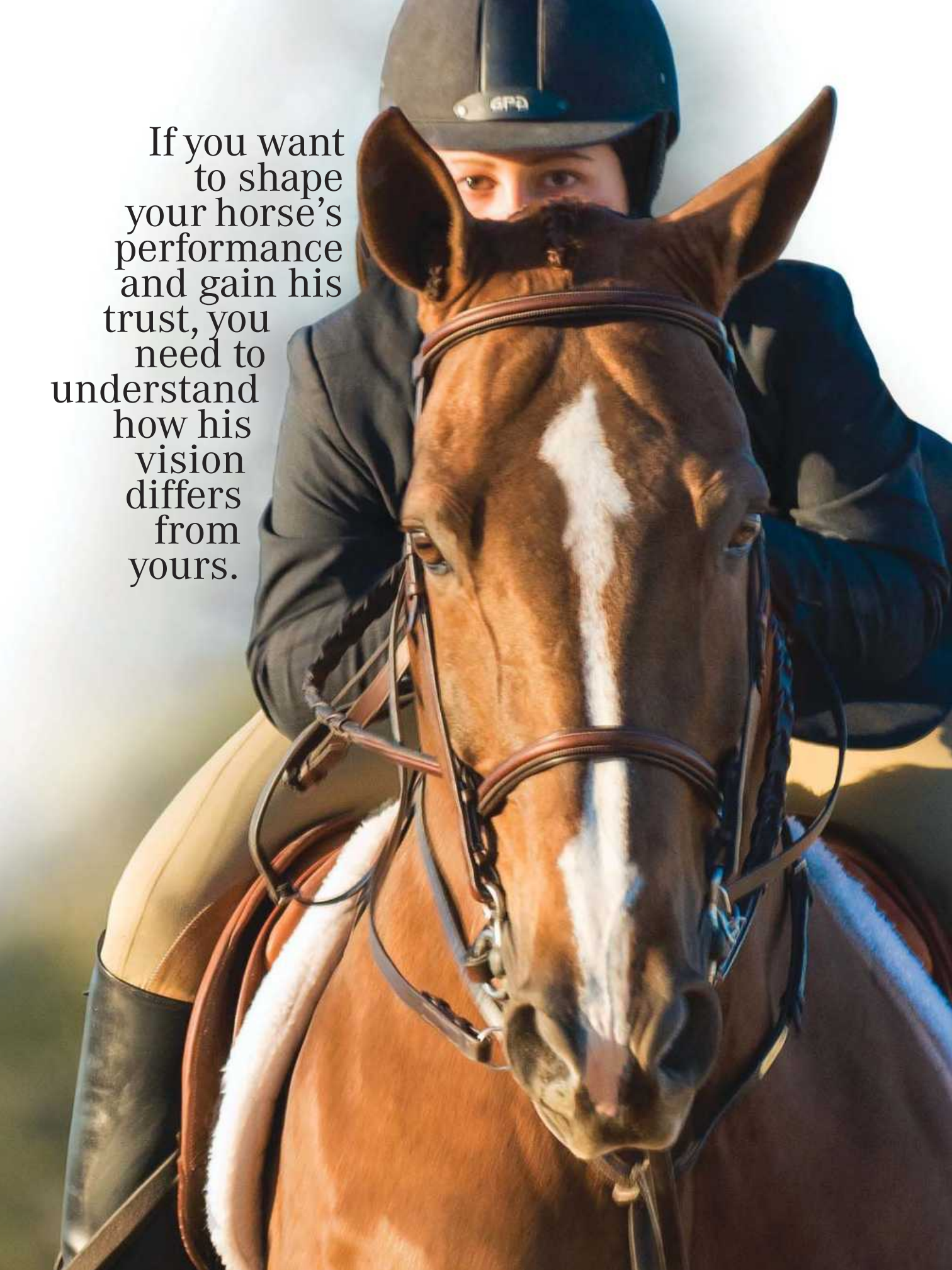


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If you want to shape your horse's performance and gain his trust, you need to understand how his vision differs from yours.

SEEING EYE TO EYE



By Janet L. Jones, PhD

See that sliver of light on the sand, shining through a gap in the roof of the indoor arena? Every time she goes past, Hawkeye arches her neck and skirts the boundary as if it's a rattlesnake. The sliver changes in size and shape with the sun's movement, and the mare seems to see each tiny difference as a brand-new snake. When a concurrent sound erupts—say, the sound of a grain of sand sliding—she leaps sideways.

These are normal behaviors that reflect the way a horse's visual systems are hardwired into his brain. We can teach horses to overcome them, but we can't make them go away. Nor can we make a horse see the way we do. How we respond to his fear depends partly on our own vision, which determines our expectations of what horses see.

Since the 1960s, cognitive psychologists have shown that we construct sight using information from our eyes combined with knowledge in our brains. Things can go wrong at either end—the eye or the brain. A person whose eyes become blind still sees images and dreams. One whose eyes are intact but whose visual cortex is damaged often sees lights and shadows but can't make sense of them. In rare cases, people who are completely brain-blind can grasp a coffee cup set in front of them or navigate around objects, responding to the physical world even though they cannot consciously see it. This ability, called "blindsight," isn't limited to humans; cortically blind animals can do it, too.

Occasionally, a smidgen of visual cortex is impaired so specifically that its owner—having otherwise normal sight—suddenly cannot see color, shape or perhaps movement. Imagine trying to cross a busy street with eyes that function normally but a brain that can't perceive motion. Cars travelling 60 miles an hour become a series of still images stopped along the road. At the next glance, they're still stopped, but in different locations.

Neuroscientist Gerald Edelman said it best: "Every perception is a creation." The trouble is that horses create their perceptions in ways that are very different from ours. Visual information travels from the eye to the brain in both species, of course. But the human brain sends back six times as much neural information in the opposite direction, transmitting messages to the sensory relay station that captures incoming views. This wiring is infrastructure for perceptual interpretation: the effect of knowledge being melded with the eye's

MARK J BARRETT

pictures of the outside world. So, who's more objective in seeing reality, you or your horse? Hate to break the news, but it's probably your horse. His brain is less prone to illusions and assumptions than yours is.

Equine vision is different from human vision in almost every way—acuity, range, eye contact and detection of peripheral motion, just for starters. If you want to shape your horse's performance and gain his trust, you need to understand how his vision differs from yours. You can then use that understanding to develop training techniques that work with the horse's visual system instead of against it.

A **DIFFERENT** FOCUS

Horses often give the impression of superb vision. Walking in an open field as a bird flicks a wing in the distance, a horse may raise his head, point his ears, flare his nostrils and widen his eyes. This impressive display of intelligence and sensitivity is sometimes called the "look of eagles." But it stems from how equine vision works. Focusing on the bird's location, the horse is trying to improve his view by raising his head and enlarging his eyes. He pricks his ears because he cannot see stationary details well. His nostrils expand to enhance his excellent sense of smell.

Equine eyes are eight times larger than human eyes; in fact, they are larger than those of any other land mammal. But a horse's acuity—the ability to discriminate fine detail while focusing on something in the center of the visual field—is considerably worse than ours. Reading is a great example of acuity. Right now, your eyes are picking up tiny differences in the black marks on a page. You can see the difference between an "e" and a "c," for example.

By convention, normal human acuity is 20/20. What a normal person sees from a distance of 20 feet is the same as what you see from a distance of 20 feet. Meaningless, right? The numbers don't tell us much until we use them for comparison. A typical horse's acuity is about 20/30. Details we can see from a distance of 30 feet, he can only see from 20 feet. A horse has to be 50 percent closer to see the same details. Ah, that means something!

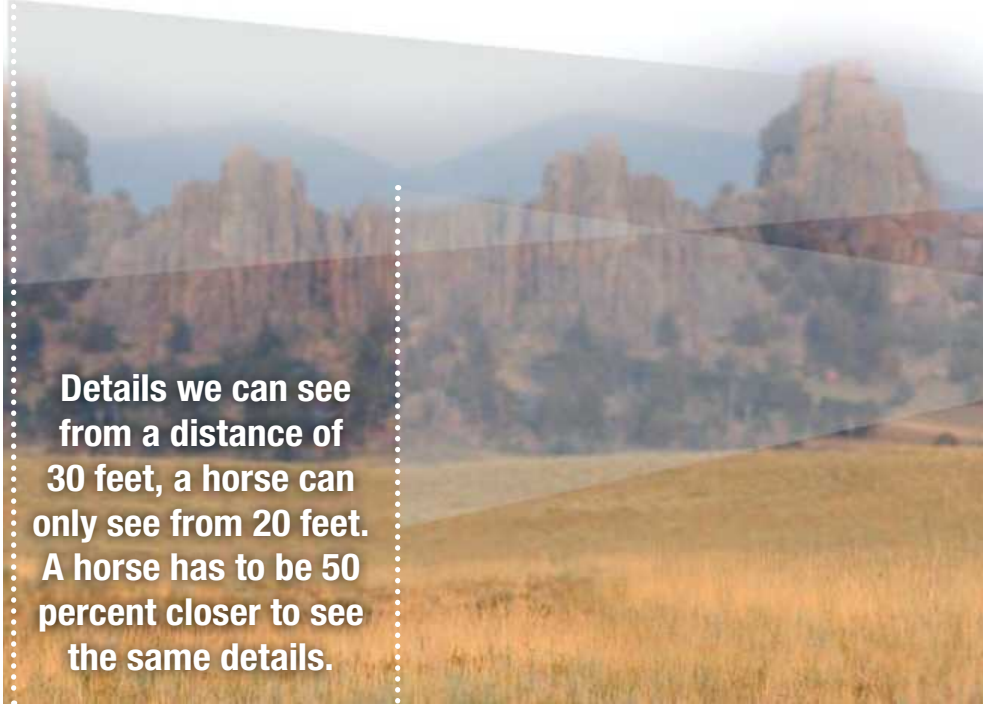
A 50 percent deficiency is enough for any rider to consider. Imagine what a horse sees when you ride him to a jump. For you, it's clear, sharp and bright. You'd be mighty nervous if it looked fuzzy and faded. But equestrians are often startled to see photographs constructed to show what a jump looks like to a horse. Even in sunshine, the horse's view of a jump is blurry, hazy, dim, flat, vague … all the adjectives you'd rather not ponder as you're galloping 30 feet per second toward a big oxer that could ruin your day.

Individual horses, like people, differ in acuity. About 23 percent of horses are nearsighted, which means they do not see details clearly until they get close to an object; 43 percent of horses are farsighted, able to make out details only as they get farther from an object. It stands to reason that slightly farsighted horses will excel in disciplines like jumping where the ability to home in on fine points from a distance fuels their athleticism.

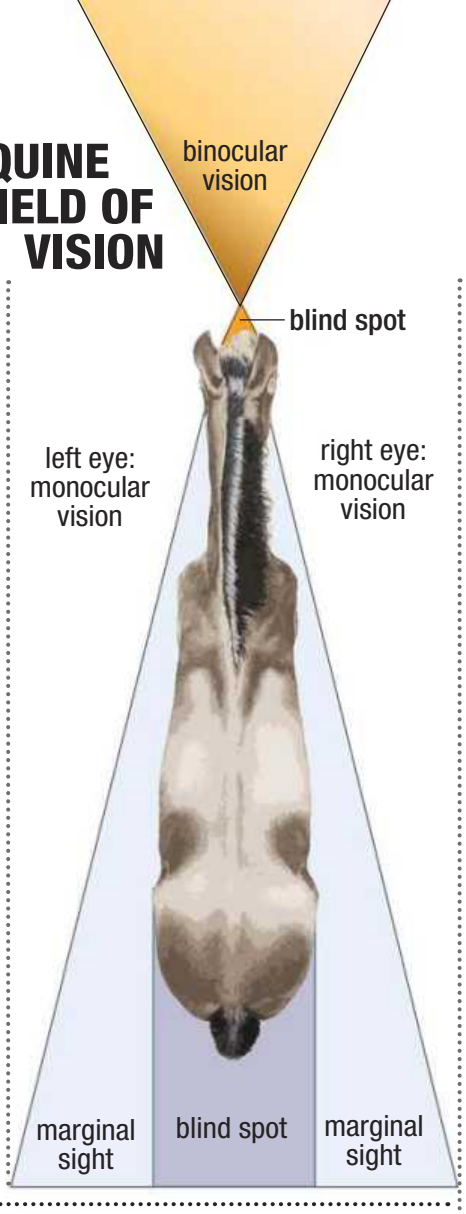
Acuity also changes with age, as anyone who has reached age 50 can verify, because the eye's lens loses flexibility over time. The best acuity in horses occurs around age 7. Prior to that it is not fully developed, and thereafter it begins to decay. Horses with long convex noses, like many Standardbreds and Thoroughbreds, have better acuity than do horses with short concave noses, like Arabians.

POINTS OF **VIEW**

The most obvious features of a horse's eyes are their size and placement on the sides of the head. Human eyes are comparatively smaller and point forward. The position of the



EQUINE FIELD OF VISION



CELIA STRAIN

eyes on the face accounts for profound differences in the ways people and horses see, dictating visual range, peripheral motion detection and depth perception. A horse's vision is determined by 5 million years of equine evolution. Trendy tie-downs and personality assessments won't change that—we have to accept how horses see the world and work with it.

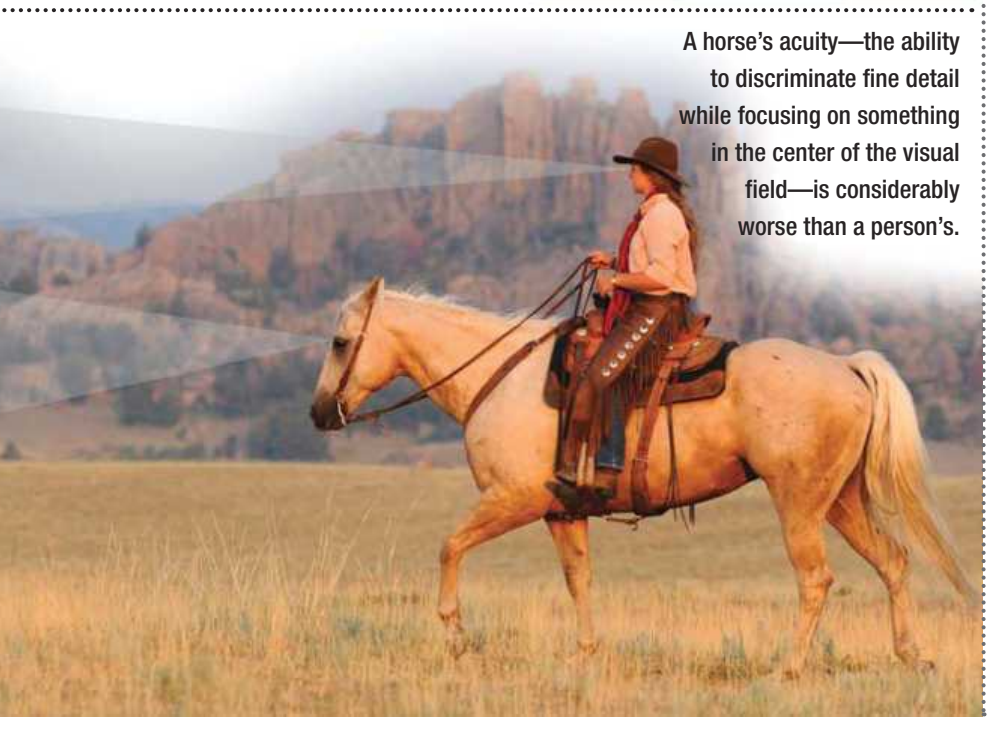
Human sight is accurate enough to decode tiny marks on a page, but only for a small slice of the view. When you read, only two or three words in your central vision are truly clear; the rest are blurred. Stretch your arm full length to your side, holding up your index finger. Look straight ahead. You won't see the finger. You can't even see your arm. Now move your arm slowly in a wide outstretched semi-circle toward the front, keeping your eyes focused on a distant point in front of you. No cheating! The finger remains invisible until it reaches almost a 45-degree angle. Human vision is limited to roughly 45 degrees on either side of our noses, for a total of about 90 degrees.

By contrast, if your horse could hold his hind hoof straight out to his side, it would be almost in the center of his vision. Because his eyes are on the sides of his head, he has a 350-degree view, almost four times greater than the range we see. Think of how dependent we are on sight, how important it is to us. Now imagine we had four times that much vision to process every second of the day. We'd be edgy, too!

The horse's visual range stretches from the end of his nose all the way around to an imaginary line extending straight back from his hip. The Attack Tractor that you cannot see approaching from behind your shoulder is well within his line of sight. It's coming toward him, maybe at a rate faster than he is moving. Some horses see this as a chase, and every fiber of their evolutionary being says that the way to survive a chase is to run. Now. The balloon bobbing at the side of the arena is the equivalent of a ball soaring straight toward a horse's face. If that balloon is yellow, it will be especially bright to equine eyes. No wonder he shies and bolts.

The horse sees a broad band of the world to the sides and back of his body, but it is narrow. His vision is poor above and below the level of his eyes. Sights directly to the horse's side but on the ground or in the air are difficult to see unless he cocks his head. Equine vision also creates blind spots. A horse cannot see a person standing directly in back of him. Surprised from behind, even the sweetest horse can kick in almost any direction. That's where that tenet of good horsemanship—approaching the hindquarters from the shoulder—comes from. You want to make sure he knows you're there.

A second blind spot exists in front of the horse's face, from his eye level



A horse's acuity—the ability to discriminate fine detail while focusing on something in the center of the visual field—is considerably worse than a person's.

CARIEN SCHIPPERS

to the ground below his nose and out to about six feet. A hand suddenly raised will appear to him to come from nowhere. He cannot see the grass he grazes on, the bit he accepts, the fingers that stroke his muzzle. He uses the whiskers around his mouth to sense these objects. A horse whose whiskers are shaved is at a sensory disadvantage.

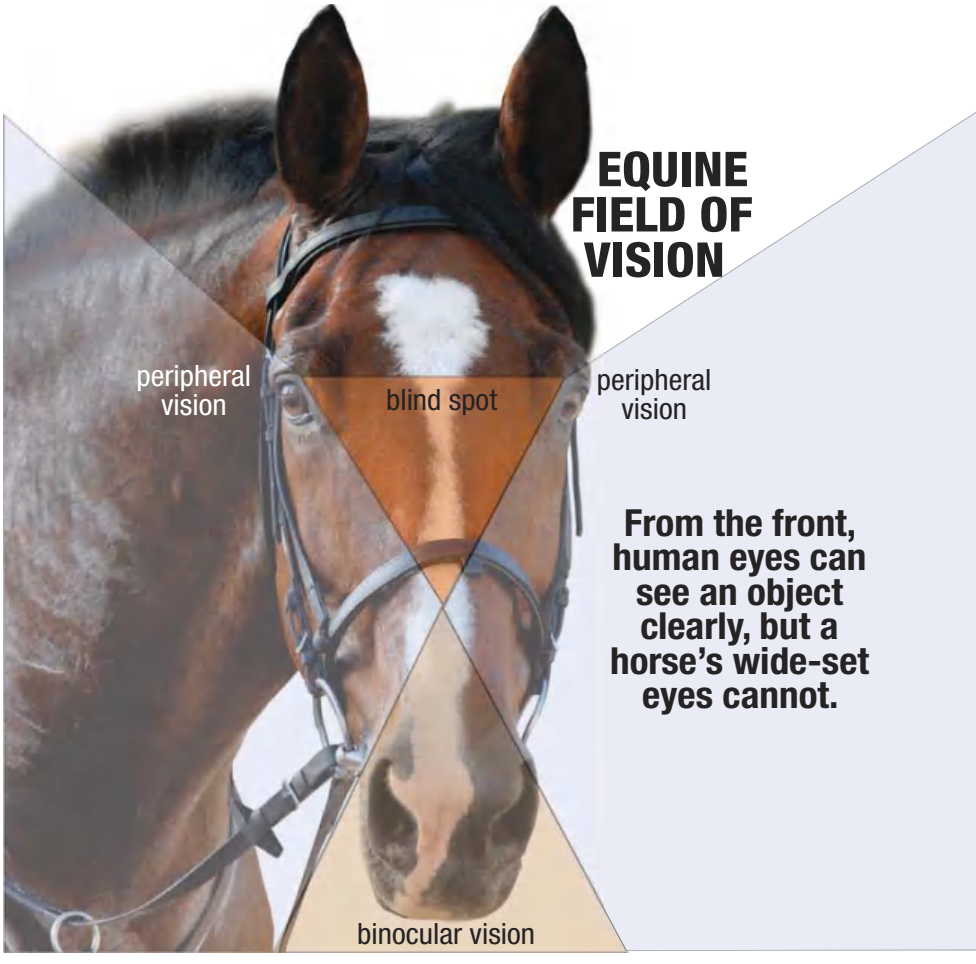
LOOKING **SIDEWAYS**



One of the most common mistakes people make when dealing with nervous horses is to thwart their side view. The rider, with forward facing eyes, assumes that positioning a horse for a frontal view is best for all. Some equestrian websites even advise this position. The rider pushes Hawkeye straight toward the sliver of light on the sand that already scares the bejeebers out of her, then tries to make her stand still and stare at it head on, eyes bugged out like tennis balls. These demands defy the functioning of a horse's brain.

Why? First, from the front, human eyes can see an object clearly, but a horse's wide-set eyes cannot. All Hawkeye knows is that her rider is upset, forcing her forward to a place that she considers threatening. Second, as she reluctantly approaches, the light-snake vanishes from Hawkeye's line of sight, which of course makes it all the more frightening. Third, standing still concentrates the horse's fear rather than alleviating it. Fourth, when Hawkeye cocks her head and pivots to the side for a better view, her rider pulls on one rein and presses with the opposite leg, pushing her back to a stance where equine vision is worst.

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DUSTY PERIN

Fear is in the eye of the beholder. We might think it silly that Hawkeye is afraid of flapping plastic or a paper cup … but how would you feel about having a big, hairy tarantula running through your hair?

Let's give Hawkeye a break. Start with some groundwork. Try leading her toward that sliver of light, but if she balks, don't push. Allow her to move in circles or loops at the closest distance she considers safe. Then use some vicarious learning: Let Hawkeye watch a familiar human friend walk to the object, stand next to it and speak calmly. She will recognize the voice. Stroke her neck and encourage her to approach. A step or two more than she wants equals success. Offer praise and stop for the day.

If this technique fails, have your friend bring a known, preferably herd-dominant horse to the object. (Verify ahead of time that this horse is unafraid.) Speak slowly in a low pitch and stroke your horse's neck while she watches her buddy survive the terror. If this also fails, move out of sight of the object and put your horse to work on a completely unrelated task. Tomorrow, start building her trust using objects that she considers less frightening. Eventually, you will be able to return to the original fright-sight and try again.

When your horse is relaxed while viewing the threat, even if only from a distance, walk her back and forth past the object before requesting a head-on approach. When she is willing to advance face-first, encourage her to stretch her neck down and forward for a good sniff. Stroke her neck, speak calmly and let her sniff the object. She'll probably jump a couple of times—that's OK, I'd jump too if you asked me to sniff

a tarantula. Touch the hazard so your hand makes a soft noise against it; this will allow the horse to learn more through her excellent hearing. Gently roll or push the object around as the horse becomes accustomed.

Now, let's suppose the fright-sight appears while you are riding. It's tempting to call it a day and drive to the nearest ice cream store for solace. But that only teaches Hawkeye that when she shies, you will take her to her comfy stall. Instead, remain mounted and distract her with a task that moves her away from the threat. Yes, this feels like "letting her get away with it," but it's only one step of a larger process. Try riding to a distance the horse considers safe, with the object in view. Trot back and forth in a way that places the object most frequently at the horse's side. Focus on pace, relaxation and inward bend; ignore whatever scares her.

When Hawkeye is calm, quietly enlarge the loops, maintaining any distance that allows her to remain tranquil. Then ride a foot or so closer to the object each time you go by. When she passes it calmly, even from a distance, stroke her neck and speak kindly. If she skirts it, decrease the loop next time to make it easier for her. Move closer when she is ready, not when you are ready.

A simple lesson might take one minute or 100, two days or two months. Try not to push or punish fear. If the horse needs a 50-foot berth to negotiate an object calmly, give it to her. The priority is her mental composure, not her physical distance from the scary view. Tomorrow you can set the goal for composure at 45 feet. If you're rushed or annoyed start the lessons another day. Forcing a horse is a good way to destroy her trust in you, frighten her all the more, and wake up with Nurse Ratched by your bed.

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PREDATOR AND PREY

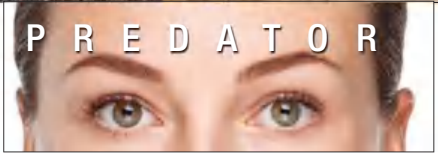
Beautiful wide-set equine eyes reflect the evolutionary needs of prey. We hate to think of ourselves as predators, but our forward-facing eyes tell every horse the truth. Prey animals identify predators by smell and sight—including their view of eye position. One look at a human face, and the evolutionary equine brain knows we are predators.



Because horses see us as natural predators, human eye contact has a warning effect. Next time your little gangster needs a reprimand, add some stink-eye to your verbal reminder. It's the human equivalent of an alpha mare's flattened ear. (If you can flatten your ear, that would be even better. Let me know how that goes, OK?) If your horse moves too quickly on a longe line or in a round pen, try looking down, watching and listening to his feet surreptitiously to stay safe. If he frets when entering a trailer, ask onlookers to go away. Hard to catch? Look to the side, or slowly walk backward toward the horse while speaking quietly.

Evolution has also equipped horses to be highly aware of peripheral motion. To move in for a kill, predators need sharp sight in central areas of the visual field. Prey animals, on the other hand, don't often need to know *what* they have seen. They only need to know that they *have* seen. In other words, horses must notice peripheral motion immediately, regardless of what it is, so they can leave the scene at high speed before a potential predator begins to approach. When needed, equine eyes can even move independently to scan one side of their world more intently than the other.

The human brain takes half a second to process each glance at the world and determine what it has seen—shape, color, size, distance, importance and so on. Half a second of processing is out of the question for a horse in the wild: He needs to notice a tiny movement in the bushes and step on the gas. Every millisecond of delay could mean death. If the movement turns out to be a bicycle instead of a lion, that's OK. Nothing is lost by running from a bicycle.



Beautiful wide-set equine eyes reflect the evolutionary needs of prey. We hate to think of ourselves as predators, but our forward-facing eyes tell every horse the truth.

The horse's natural reliance on peripheral motion detection dictates his need to shy or bolt—and otherwise "misbehave"—while ridden. Help him out by sharpening your peripheral senses. Try to become more aware of objects behind and to the sides of your eye, putting your ears, nose and cognitive experience to work. If a horse is full of corn in an area where he is normally calm, investigate. Chances are good that he notices something you do not and is trying to tell you about it.

Acuity, range, eye contact and peripheral motion detection—in all these ways the horse's vision differs from a person's. Keeping these differences in mind will help you to communicate more effectively with your horse and train him in ways that accommodate his senses. In the meantime, keep your eyes open for those light-snakes on the sand.

About the author: Janet L. Jones earned her PhD in cognitive science, the study of the human mind and brain. She won UCLA's dissertation award for her research on brain processes. Now professor emerita, she has taught the psychology and neuroscience of memory, language, perception and thought for 23 years and is the author of three books. She has competed in Western, English, reining, hunter and jumper classes in five states and uses the principles of dressage with every horse. Jones currently owns a 17.1 hand off-the-track Thoroughbred who makes every day interesting. Readers can reach her at ridewithyourbrain@gmail.com.

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Riding trim

My weight loss journey helped me become healthier, stronger and more confident—and it made me a better rider.

By Hope Ellis-Ashburn

There was a time—about seven years ago—when I dreaded pulling on a pair of riding breeches. Once dressed, I would scurry past the mirrors in my house, scowling if I happened to catch a glimpse of myself: I was 50 pounds overweight and self-conscious about it.

But my problem was more than just being unhappy with my appearance. I was also unfit, and I could no longer fully enjoy many of the equestrian activities that I loved. I went trail riding less often because I was afraid I might have to get off and knew that I could not mount from the ground without assistance. I lacked the stamina to complete even a one-hour riding lesson without frequent breaks. Horse show classes left me gasping for air. In short, I had some issues that I wanted to fix, and it was time to tackle the problem.

Weight loss is a deeply personal journey. I am sharing my story about this time in my life not as an embarrassment, but as an opportunity to encourage others and to help people learn from my mistakes. My goal is not to tell you that you should lose weight but, should you make the decision to do so, to provide encouragement. Despite what you may have read, it is possible.

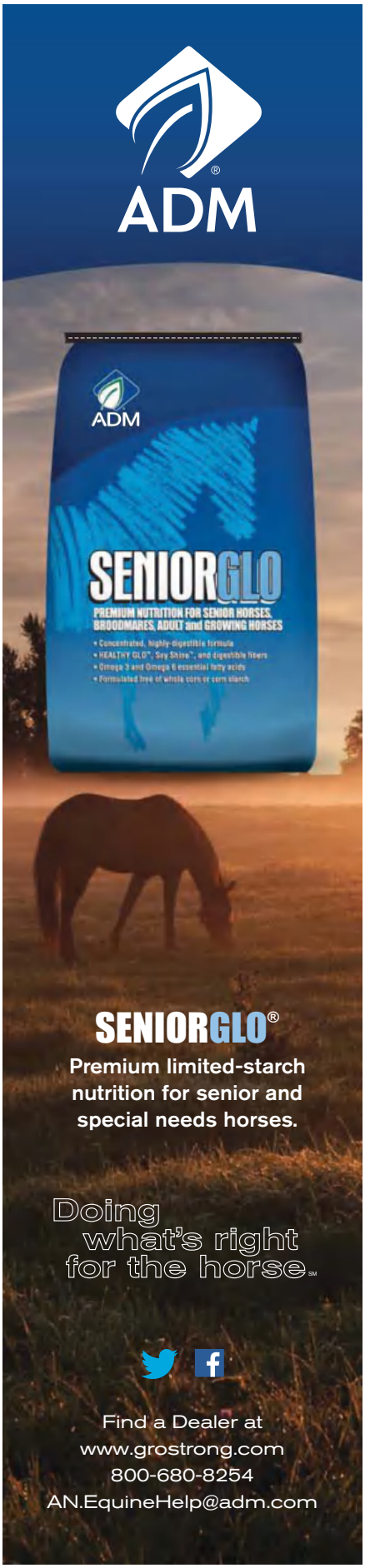
My weight gain had happened slowly. Years of unhealthy eating and then pregnancy weight finally caught up with me. Many people assume that those who are overweight simply eat too much and don't get enough exercise—in my case, though, inactivity wasn't the issue. In addition to farm work, I rode regularly, taking lessons and even competing in a few shows. As it turned out, however, what I considered exertion back then was not the type of sustained physical activity necessary to lose weight.

My first strategy was simply to exercise more without changing my diet. This didn't work—it only made me hungrier. But my determination kicked in, and I began again. I knew that I needed a new plan, so I set about researching weight loss programs that offered the structure and goal-setting that I craved.

Finally, I found a program that not only met those criteria but looked like one I could stick with for the long run. So I embarked on a regimen of mindful food intake and serious workout sessions—and eight months later I had met my goal weight. I know many other riders who face similar challenges, so by way of encouragement I'd like to share what I learned.

• ***Be ready.*** My journey began only when I was ready to commit. My goal weight was based on when I remembered feeling most satisfied with myself. Setting a goal with a numeric value, rather than "just trying to lose some weight," fit my personality well, and I'm glad I made it a priority.

• ***Find what motivates you.*** I had strong motivators that included looking better in my riding clothes, improving my riding and increasing my stamina. I celebrated my achievements along the way with small rewards such as a weekly splurge meal so I did not constantly feel as if I were denying myself. I also tried to avoid punishing myself too harshly for small lapses. I just corrected



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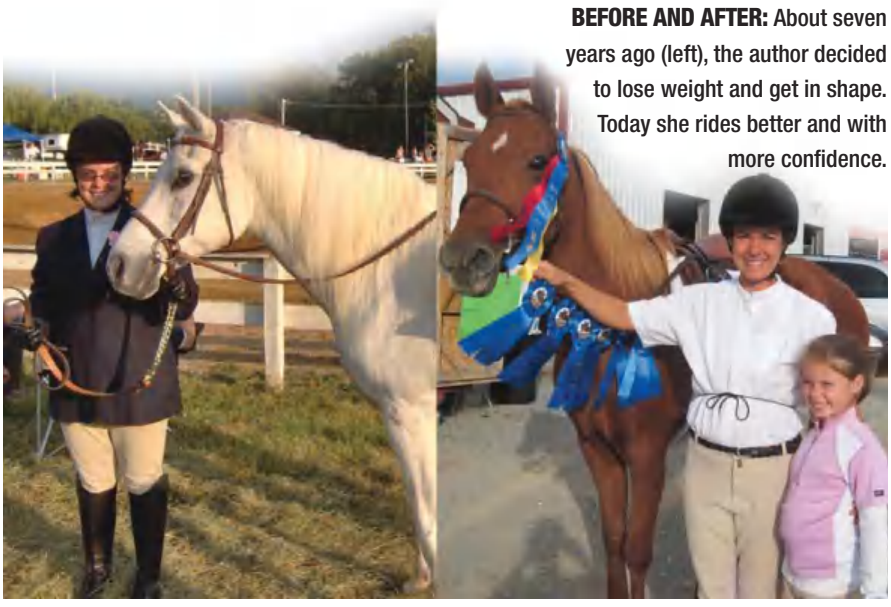
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BEFORE AND AFTER: About seven years ago (left), the author decided to lose weight and get in shape. Today she rides better and with more confidence.

my mistakes and kept pushing forward.

• ***Choose healthier foods.*** I began reading labels and was surprised to discover that many foods I had thought were healthy were not. Many flavored yogurts, for example, contain as much sugar as a full-size candy bar! I also began measuring portion sizes and was often startled to see the difference between the correct, measured servings versus what I had been eating. Finally, I paid more attention to calorie counts. While it's not necessary for everybody, I found that an easy way to cut calories was to eliminate soft drinks.

The appearance of my meal plates changed dramatically—suddenly I was eating a lot more vegetables. Overall, I was stunned to learn how much I could actually eat and still lose weight just by making wiser choices.

• ***Get serious about exercise.*** Once I began to get my diet under control I started to evaluate my activity level. I have always loved riding, so it was easy to convince myself I needed to spend more time in the saddle, but riding alone was not enough.

I needed to add cardiovascular and strength training to my exercise regimen. I knew from experience that a gym membership or exercise classes were not for me. I needed something a little less public that would fit my busy schedule. I chose a program I could do at home, and I set aside a specific time of day just for my workouts. With a small investment in basic home gym equipment and the purchase of some second-hand exercise DVDs, I was on my way.

Almost immediately I noticed my riding improve. My workouts increased my core strength dramatically, and I also became more aware of and better able to control my body, which improved my riding aids coming from my seat, legs and posture. My energy level increased and my stamina improved. I was no longer too tired to ride after the farm chores, and I could last longer in the saddle.

• ***Find a way to keep yourself on track.*** As a high school teacher, I am accountable to a number of different people; this helps me to stay focused on my job. To lose weight, I knew, I would have to find a way to hold myself accountable—to myself. What worked for me was to put everything in writing.

Keeping a food and exercise journal enabled me to track changes over time, which in turn helped me to recognize my successes as well as my shortcomings. Recording my exercise as well as all of my snacks and meals helped me to see how my choices led to changes in my weight, both positive and negative. If my weight wasn't going down, analyzing all this information helped me to find reasons why. This wasn't always easy to pinpoint, but more often than not I was able to figure out where I needed to do better.

In the beginning, I underestimated how important these journals would be. But even now, I find that going back to look at them serves as a confidence booster in other areas of my life, including riding. They are proof that I am capable of handling a problem. Even today I monitor myself to make certain that I stay on track.

• ***Keep it up to keep it off.*** After I met my goal, maintaining my weight loss was my next challenge. My doctors tell me that few people who lose weight manage to keep it off for the long term, and I know it isn't always easy. Over time I've gotten better at it, but every day I still have to make the conscious decision to eat well and exercise.

Now, seven years later, I am still at my target weight. I am healthier overall, and I no longer feel self-conscious about how I look in my breeches. I can ride for much longer periods, and although she cannot say so, I am sure that my horse appreciates the difference as well. Still, one of my proudest moments on this journey was a seemingly small victory. Not long ago, I was forced to dismount while I was out on a trail ride. This time, however, I didn't have to search out a tree stump to get back on. I simply placed my foot in the stirrup from the ground and swung aboard unassisted.

Like so many of us, I still struggle to find time to ride while balancing family life, a full-time job and a farm, but I have found that the extra work involved in maintaining my health is well worth the effort. In fact, my weight loss journey has reinforced for me the idea that all things are possible.

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RECOVERY

A remedy for muscle atrophy?



Q *I have an 11-year-old Friesian sport horse who has just completed treatment for EPM. We have been given the OK to go back to work, but because of the disease he lost all the muscle on the left side of his head. There is no muscle where his jaw is or above his eye. Will the nerve damage to the head ever heal? Are there any exercises or massage that may help?*

Cheryl Martinell
Maud, Oklahoma

A Muscle atrophy can be caused by the deterioration of the muscle cells themselves or damage to the nerves that control the muscles, which is the case in equine protozoal myeloencephalitis (EPM). A disease of the central nervous system, EPM is caused by the protozoal organisms *Sarcocystis neurona* and *Neospora hughesi*. When a horse becomes infected, these organisms can migrate into the central nervous system and cause inflammation and tissue damage anywhere in the brain and spinal cord.

Because this damage to the central nervous system interrupts the messages sent to the peripheral nerves, which carry sensory impulses and control voluntary movement, the affected muscles may become paralyzed and atrophy. The muscles involved depend on which parts of the central nervous system are damaged by the organisms. Therefore, atrophy is generally on only one side, and the location and degree of muscle loss can vary.

Treating EPM with vitamin E and medications including ponazuril will often result in some degree of improvement in muscle atrophy as the affected nerves heal. However, there is no guarantee this will happen, and often some degree of atrophy will be permanent.

Exercise that targets the affected muscles also encourages healing. Personally, I've had more success improving atrophy of the back and gluteal muscles than the muscles of the face, which may be due to a better ability to rehabilitate these muscles through exercise.

STIMULATION: Several therapies may help a horse's muscles recover after EPM treatment, including electroacupuncture.

DUSTY PERIN

Several therapies may help a horse's muscles recover after EPM treatment. These include acupuncture, which involves the insertion of thin needles into the affected area, and electroacupuncture, in which the needles carry a mild electric current. These treatments, administered by a trained veterinary acupuncturist, stimulate the neuromuscular junction—the junction between a nerve fiber and the muscle it supplies—to help rebuild the muscle. Another option is electrical muscle stimulation, which uses electrical impulses from electrodes placed on the skin to cause contraction of the muscles. Electrical muscle stimulation helps build new muscle fiber in a way that's similar to resistance training.

Unfortunately, none of these treatments are guaranteed to restore atrophied muscles. Only time will tell if the muscle mass will improve or return to normal.

Courtney Wittich, MS, DVM
Hagyard Equine Medical Institute
Lexington, Kentucky

THIS MONTH'S EXPERT



Courtney Wittich, MS, DVM, specializes in sport horse medicine at the Hagyard Equine Medical Institute, where she divides her time between Lexington, Kentucky, and Wellington, Florida. Previously, she served as an official horse show veterinarian for Horse Shows by the Bay in Michigan, the Kentucky Horse Park show circuit, the Desert HITS circuit in Thermal, California, and other events. She received her veterinary degree from Ohio State University and her Master of Science in veterinary epidemiology from Texas A&M University. She grew up around horses and spent her free time in high school and college riding and showing on the hunter/jumper A circuit on the East Coast and in Kentucky.

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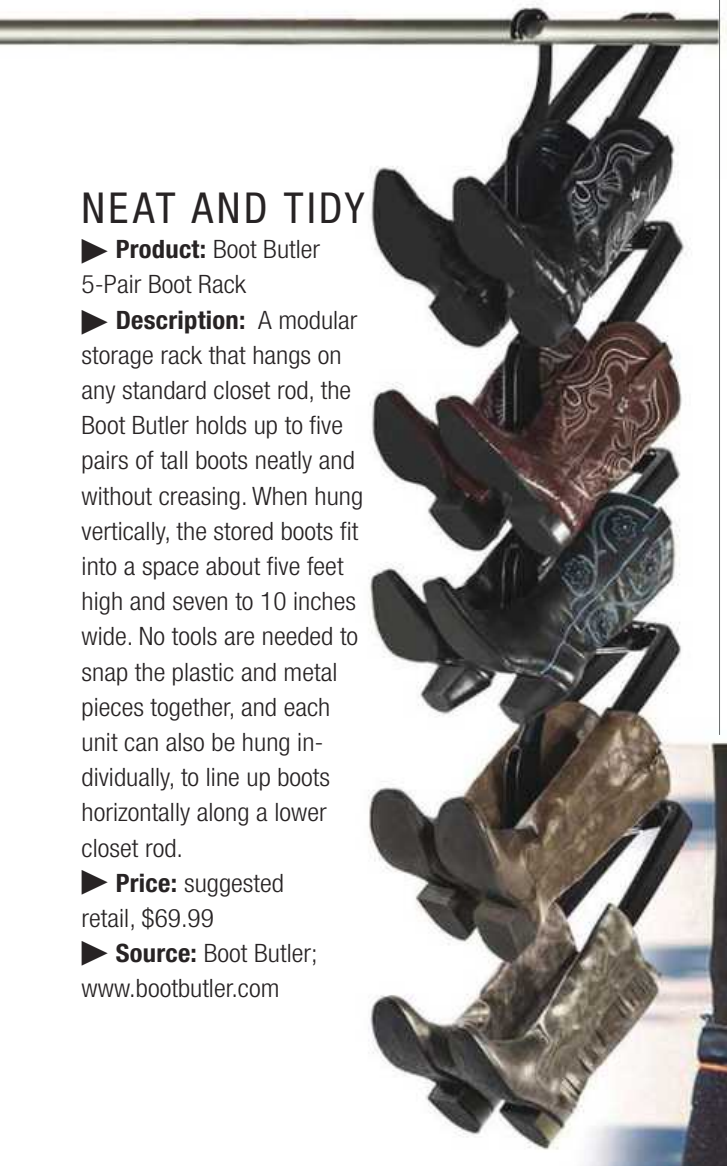
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▶ **Price:** suggested retail, $69.99

▶ **Source:** Boot Butler; www.bootbutler.com



MINERALS WITH A TWIST

▶ **Product:** Officinalis Flower with Lollyroll

▶ **Description:** Lollyrolls are sweet and salty licks made with all-natural fruits, herbs and unrefined sea salt, which also provides essential minerals including magnesium, potassium, zinc, selenium, iron, copper and manganese. Lollyrolls are available in four flavors: anise and fennel; apple and chamomile; carrot and marigold; or strawberry and carob. Each comes mounted in a flower-shaped, durable plastic stall toy that may be hung by two ropes or affixed permanently to the stall wall.

▶ **Price:** suggested retail, $39.95 for flower with a lollyroll, $11.95 for a two-pack refill

▶ **Source:** Officinalis; www.officinalisusa.com



MAGNETIC APPEAL

▶ **Product:** Rambo Ionic Stable Boots

▶ **Description:** The inner lining of the Rambo Ionic Stable Boots is infused with ground tourmaline, a common crystal with metallic ions that create a negative charge. The boots are designed to attract water molecules in the underlying tissues, to stimulate circulation. The manufacturer recommends placing the boots on a horse's legs prior to exercise—to increase blood flow and prepare the muscles for work—as well as after exertion, to speed recovery and restore a balanced pH.

▶ **Price:** suggested retail, $119

▶ **Source:** Horseware Ireland; www.horseware.com

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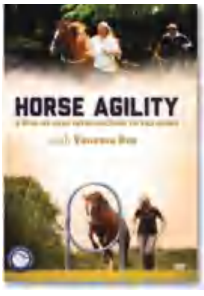
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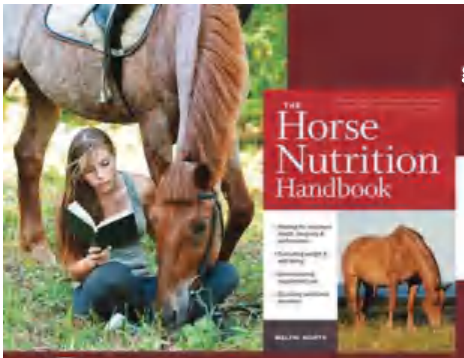
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EQ GLOSSARY

antibody—disease-fighting substance produced by the body in response to the presence of an antigen.

antigen—substance, often a protein, that the body's immune system recognizes as foreign and reacts to by producing an antibody.

ascarid *(Parascaris equorum)*—large intestinal roundworm, about the size of a pencil, that infects foals and young horses and may retard growth or block the intestines.

Banamine—trade name of flunixin meglumine, a nonsteroidal anti-inflammatory drug used to control inflammation and pain primarily associated with colic and muscle injuries.

body condition score (BCS)—a designation, based on a nine-point numeric scale, indicating the amount of fat on a horse's body. A BCS is assigned after a visual and hands-on appraisal.

bute—colloquial term for phenylbutazone, the generic name for an odorless anti-inflammatory medication used in the management of joint, bone and muscle injuries or disorders.

collagen—fibrous network that forms the basic framework of body tissue.

corticosteroids—analogs of the hormone cortisol produced primarily by the adrenal glands; they may be natural or synthetically produced for injection.

cortisol (hydrocortisone)—adrenal hormone regulating fat and water metabolism, muscle tone, nerve stimulation and inflammation.

equine herpesvirus (EHV)—a family of viruses that primarily cause chronic respiratory infections in horses (EHV-1, EHV-4). EHV-1 can also cause abortions in mares and, in rare cases, both EHV-1 and -4 can cause neurological signs, including progressive weakness and incoordination. EHV-3 causes a venereal disease called equine coital exanthema.

equine metabolic syndrome—endocrine disorder characterized by increased fat deposits in specific locations of the body or overall obesity; insulin resistance, which leads to abnormally high levels of the hormone circulating in the bloodstream; and a predisposition toward laminitis in the absence of other recognized causes.

glucosamine—a building block of chondroitin sulfate, a component of cartilage, as well as hyaluronic acid, a component of synovial fluid.

glycogen (animal starch)—chief form in which carbohydrates are stored in the body.

insulin resistance—metabolic disorder, similar to type-2 diabetes, that occurs when certain cells in the body become less sensitive to the action of insulin, and normal amounts of the hormone can no longer keep adequate amounts of glucose moving into the cells for use as fuel.

laminitis—inflammation of the sensitive plates of soft tissue (laminae) within the horse's foot caused by physical or physiologic injury. Severe cases of laminitis may result in founder, an internal deformity of the foot. *Acute* laminitis sets in rapidly and usually responds to appropriate, intensive treatment, while *chronic* laminitis is a persistent, long-term condition that may be unresponsive to treatment.

navicular syndrome—unsoundness arising from inflammation of any origin occurring near the navicular bone.

nonsteroidal anti-inflammatory drug (NSAID)—drug that contains no steroids and acts to reduce heat and swelling.

pituitary pars intermedia dysfunction (PPID, Cushing's disease)—disease caused when the cortex of the adrenal gland produces excessive amounts of hormones, including cortisol; signs include persistent long hair, thin skin, fragile bones, stupor, weakness and sweating.

ringbone—arthritis of the pastern joint ("high ringbone") or coffin joint ("low ringbone").

trachea—flexible tube connecting the back of the pharynx to the lungs; passageway for inhalation and exhalation.

ultrasound—high-frequency sound waves, above the range of human hearing. Ultrasound is used diagnostically, to image body structures, and therapeutically, to break down unwanted tissue and promote healing by stimulating circulation.

West Nile virus—flavivirus transmitted by mosquitoes. West Nile virus can infect birds, horses, humans and other mammals. In horses, as in people, infection with the virus usually causes little or no illness. For reasons not yet determined, however, West Nile infection sometimes triggers swelling of the brain (encephalitis) that produces limb weakness, muscle fasciculation (twitching), incoordination, behavioral changes, paralysis and recumbency. In severe cases, West Nile encephalitis can lead to coma and death.

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Equus Issue 461 (ISSN 0149-0672/USPS 501-430)

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Second chances

When I searched for a quiet beginner's horse, I found my perfect match in the last place I would have expected.

By Therese Foster

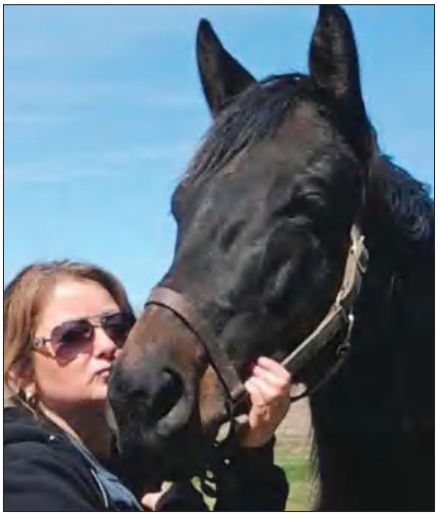
For me, volunteering had always been a way to be near horses when I couldn't have one of my own. My love affair began as a young girl, reading every horse book and fantasizing about being Elizabeth Taylor in "National Velvet." Once I was an adult, I started helping out at a therapy program that taught disabled children how to ride and care for horses. There, I learned the basics of grooming, tack and safety.

I also frequented Finger Lakes Thoroughbred Adoption Program (FLTAP), in New York State, just to keep alive my dream of someday owning my own horse. At age 53 I figured it was just that, a dream. I knew these beautiful athletes were too much horse for a beginner like me.

One day over lunch, an old friend told me he'd heard about a couple of nice, quiet horses that were being given away. He also gave me a little pep talk about following my dreams. Enthusiastically, I gathered all the information and called my brother who owns a nearby farm. He told me that he'd like one of the horses for himself, which sounded perfect to me. I was so excited. Then my friend called me back with bad news: The horses had already been given away.

But now that the idea was in my head, I decided I could rescue a horse from somewhere else. I scoured many ads for horses for sale or adoption, but none seemed like a good fit for me.

My heart just about broke in half. But now that the idea was in my head, I decided I could rescue a horse from somewhere else. I scoured many ads for horses for sale or adoption, but none seemed like a good fit for me. Still, a little voice in my head told me that maybe it was not working out for a reason. I have always been a firm believer that if something is meant to happen then the pieces would fall into place: That wasn't happening. Maybe I wasn't meant to have a horse.



THE RIGHT FIT: For the author, a retired racehorse named Jolla turned out to be the right horse at the right time.

Discouraged, I went out to FLTAP just to hang around the retired racehorses and feed them some peppermints. Only this time, there was a newcomer in the barn.

"La Jolla Lu, 6-year-old mare" was the information printed on the stall nameplate. Usually, the cards list an adoption price, but that information was missing. The mare was friendly, nudging me as if we were old friends. Julie, the barn manager, greeted me as she always did, then started telling me about Jolla: She'd just completed rehab for a bone spur in her knee; she was offered for adoption for light riding only; she was very gentle and considered a great beginner's horse. I protested my lack of experience, but Julie threw in one more pitch: Jolla was free to a good home after board approval.

Could this be why I couldn't find any other horse? I stepped into the stall to see how Jolla would respond to having me in her space. She nuzzled me as I brushed her mane and just kept staring at me as if to say, "Where have you been?"

Owning Jolla has changed my world. I try to visit every day, if not to ride, then just to spend time grooming her. This partnership is full of new experiences for both of us. For me, I had no experience in horse ownership. For Jolla, the only life she had ever known was racing. Together, we have discovered a whole new world while developing a bond—trusting in each other—as we figure it all out.

My goal for sharing my story is to encourage other people to consider adopting these beautiful off-the-track Thoroughbreds. Many are in good health and have always received excellent care. Each deserves a second chance to become a real winner.

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